

UNITED STATES OF AMERICA:
WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

JUNE, 1888.

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1888.

List of merchant marine steam and sailing vessels from which International Meteorological reports were received at the Office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of June, 1888.

Name of vessel.	Captain.	Name of vessel.	Captain.	Name of vessel.	Captain.
Br. s. s. Adriatic	Capt. J. G. Cameron.	Br. s. s. Germanic	Capt. B. Goodell.	Br. s. s. State of Indiana	Capt. A. Ritchie.
Aqua	J. C. Adair.	Glendale	W. Dickman.	State of Nebraska	A. G. Brant.
Alaska	T. M. McKnight.	Grecian	C. E. Le Gallais.	State of Nevada	J. A. Stewart.
Alaska	Geo. S. Murray.	Grecian	A. J. Jeffrey.	State of Pennsylvania	A. J. A. Mann.
Alone	Morris.	Grecian	J. Lund.	State of Texas	Gilbert Williams.
Alone	W. J. Robertson.	Hannoula	C. Hebbich.	Stockholm City	A. Thompson.
Alone	H. Christoffers.	Hekla	A. G. Thomsen.	Strabo	Angus Matheson.
Alone	J. W. Tobin.	Helvetia	G. Cochran.	Straits of Gibraltar	Geo. Grigs.
Alone	F. McKay.	Hertha	M. C. Nygaard.	Sully	A. Voisin.
Alone	D. Williams.	Hibernian	John Brown.	Switzerland	J. Ueberweg.
Alone	H. Heineke.	Hipparchus	W. T. Kelly.	Taormina	G. W. Koch.
Alone	F. W. Bonjer.	Holland	Thos. Footo.	Tallman	Wm. Fitt.
Alone	W. Brown.	Indiana	W. J. Boggs.	Therapia	Jao. Spedding.
Alone	J. Evans.	Iowa	E. W. Owens.	Thingvala	S. T. H. Laub.
Alone	W. T. Sherborne.	Iscia	W. Churnside.	Thuringia	G. Baysing.
Alone	S. Brooks.	Island	W. Skjoldt.	Tofna	W. Williams.
Alone	H. Low.	Istria	T. H. Fox.	Toronto	Jas. McAuley.
Alone	Wm. Owen.	Italy	W. Pearce.	Tower Hill	F. Archer.
Alone	W. H. P. Hains.	Jan Breydel	H. Meyer.	Trave	W. Willigerod.
Alone	A. H. Vipond.	Kanana	W. Gloig.	Trinidad	W. J. Fraser.
Alone	F. Mohr.	Kehrwieder	H. Spillett.	Tyrian	A. Haig.
Alone	J. Trevery.	Kickerbocker	F. Bemie.	Umbria	W. McKinnan.
Alone	R. R. Hubbard.	La Bourgogne	E. Franquet.	Urbino	P. L. Moore.
Alone	John Inch.	La Bretagne	M. de Jouselin.	Vancouver	C. J. Lindall.
Alone	R. Lomax.	La Gascogne	Santelli.	Viking	S. H. Fris.
Alone	Geo. Dunlop.	Lahn	H. Hellmers.	Waceland	H. Buschmann.
Alone	W. A. Beynon.	Lake Huron	M. L. Tranmar.	Wergeland	L. W. Hansen.
Alone	J. R. Brady.	Lake Superior	Wm. Stewart.	Werra	R. Bussis.
Alone	L. Santaulari.	Lake Winnipeg	P. D. Murray.	Weser	H. Bruns.
Alone	J. Milburn.	Lampasas	M. D. Crowell.	Westernland	Com. W. G. Hande.
Alone	Kopp.	La Normandie	G. Kersabee.	Wieland	Capt. A. Albers.
Alone	F. Manley.	Leerdam	G. Stenger.	Wisconsin	Edward Bentley.
Alone	Thomas Dutton.	Lord Clive	F. Urquhart.	Wyandotte	R. B. Boaz.
Alone	Bideker.	Lord Gough	E. M. Hughes.	Wylo	R. Miller.
Alone	H. Parrell.	Lorenzo D. Baker.	Warren F. Wiley.	Wyoming	C. L. Rigby.
Alone	J. Parazola.	Louisiana	E. V. Gager.	Ydum	D. Hagerman.
Alone	John Kelly.	Lydian Monarch	T. C. Huggett.	Zaandam	W. Pansen.
Alone	S. Nowell.	Main	J. Schunmann.	New York Herald Weather Service.	
Alone	E. H. Freeth.	Manhattan	Frank Stevens.	Abatia	J. Brown.
Alone	R. Wille.	Marathon	T. Hewitson.	City of Alexandria	John Deakin.
Alone	W. Fitt.	Mareca	L. O. Muen.	Croma	W. P. Lord.
Alone	J. H. Malet.	Martello	Wm. Abbott.	El Monte	J. W. Hawthorn.
Alone	F. Dulac.	Maryland	A. H. Luckhurst.	Ocean	C. Schmidt.
Alone	Jules Delhomme.	Mentmore	R. Boucher.	Vaderland	C. H. Grant.
Alone	O. Winkler.	Michigan	R. Griffiths.	United States Naval.	
Alone	John Robinson.	Minnesota	S. Walters.	U. S. S. Atlanta	F. M. Bunce.
Alone	H. Daniel.	Moravia	B. J. Blacklin.	U. S. S. A. D. Bache	J. F. Mower.
Alone	G. H. Brown.	Muriel	Kopf.	U. S. S. Blake	J. E. Pillsbury.
Alone	A. McDougall.	Nantasket	E. A. Richardson.	U. S. S. Constellation	P. F. Harrington.
Alone	Edward Wylie.	Nasmyth	Thos. T. Farrell.	U. S. S. Dale	J. Cross.
Alone	P. J. Irving.	Nederland	A. J. Griffin.	U. S. S. Deepatch	W. S. Cowles.
Alone	Henry Walker.	Nesmore	G. Elliott.	U. S. S. Dolphin	G. F. F. Wide.
Alone	C. Ollivier.	Nevada	P. Verriers.	U. S. S. Franklin	B. S. Richards.
Alone	S. Wohlmut.	Newport	J. A. R. Cushing.	U. S. S. Galena	C. M. Chester.
Alone	A. Campbell.	Noordland	W. G. Shackford.	U. S. S. Independence	J. W. Phillip.
Alone	J. W. Catherine.	Norrona	H. K. Nickels.	U. S. S. Jamestown	C. J. Train.
Alone	F. S. Land.	Norwegian	H. J. Isakjen.	U. S. S. Michigan	H. F. Pickings.
Alone	J. Wallace.	Nova Scotia	R. Williams.	U. S. S. Minnesota	G. C. Wiltse.
Alone	A. W. Lewis.	Oceanic	R. H. Hughes.	U. S. S. New Hampshire	F. J. Higginson.
Alone	C. W. Read.	Oceanic	John Metcalf.	U. S. S. Osage	W. B. Hoff.
Alone	A. Redford.	Ohio	Thos. Walker.	U. S. S. Portsmouth	Edwin White.
Alone	W. B. Cobb.	Olinda	R. W. Sargent.	U. S. S. Ranger	F. A. Cook.
Alone	H. Young.	Oregon	C. A. Machado.	U. S. S. Richmond	Robert Boyd.
Alone	J. Wilder.	Orinoco	H. C. Williams.	U. S. S. St. Louis	Wm. Whitehead.
Alone	W. M. Rittig.	Parisian	J. S. Garvin.	U. S. S. Saratoga	C. H. Davis.
Alone	Klinkokel.	Pavonia	W. H. Smith.	U. S. S. Swatara	J. McGowan.
Alone	E. A. Craig.	Pennland	H. McKay.	U. S. S. Wabash	C. C. Carpenter.
Alone	A. W. Wade.	Philadelphina	A. Potter.	Sailing vessels.	
Alone	B. C. Jennings.	Phoenician	Bud Weyer.	bk. Alice	W. G. Kair.
Alone	F. Henderson.	Pieter de Coninck	Sam. Hess.	sch. Annie G. O'Leary	H. Bandrot.
Alone	W. Becke.	Polynesian	D. J. James.	lg. Annie R. Storer	W. F. Adams.
Alone	F. E. Jennings.	Pomeranian	E. Smith.	Edith	W. G. Foster.
Alone	A. McLean.	Pomona	A. Kuhn.	bk. Elgia	H. W. Robinson.
Alone	C. J. Mensies.	Pontiac	H. Dalziel.	sch. Fannie E. Walston	A. L. Cummings.
Alone	E. W. Crisp.	Powhatan	J. Lege.	sp. Fidelio	C. Sander.
Alone	E. Guild.	Prins Maurits	H. W. Brown.	bk. Florence	A. P. Carter.
Alone	Geo. Dixon.	Proclia	John Jenkins.	George W. Sweeney	J. F. Hewitt.
Alone	R. S. Rigby.	Pruissan	H. Sluiter.	bk. Hanna	G. W. Hodgdon.
Alone	John Craig.	Queen	W. Bannon.	sch. H. B. Hussey	H. E. Garlick.
Alone	John Hughes.	Republic	Wm. Dunlop.	sp. Houghton Tower	Geo. Scott.
Alone	W. Topser.	Rhaetia	T. Annison.	bk. Iodine	Adam Smith.
Alone	J. McKenney.	Rhein	H. Davison.	bk. Jane Adeline	G. W. Cates.
Alone	S. Dechalle.	Rhenania	H. Vogelweang.	bk. Jennie Hulbert	G. B. Handy.
Alone	R. Grey.	Rhinland	W. Kuhlmann.	bk. John R. Stanhope	J. B. Norton.
Alone	J. H. Bennett.	Robina	G. Schmidt.	bkt. Josephine	Chas. Brown.
Alone	J. Sumner.	Roman	J. C. Jamison.	sch. J. R. Berger	C. W. Parsons.
Alone	J. Harrison.	Rotterdam	T. H. Smith.	bk. Julius	F. D. Vieira.
Alone	H. Baur.	Rugia	E. Maddox.	sp. Laemene	W. Randall.
Alone	G. Meyer.	Saale	G. Bakker.	bk. Levantor	Geo. F. Gerry.
Alone	H. S. Quick.	Saint Monans	R. Karlows.	bk. Liberia	Edward F. Page.
Alone	Th. Jungst.	Sama	H. Richter.	bk. Lillian	H. F. Schive.
Alone	A. F. Heeley.	Samaritan	H. Campbell.	sp. Light-ship No. 37	J. P. Stevens.
Alone	Wm. Tyson.	Santiago	H. Bernpohl.	bk. Mary Fink	Andrew Jackson.
Alone	S. de Fellerio.	Sarmatian	R. W. Neate.	bk. Negunticook	D. B. Darragh.
Alone	T. Cook.	Saxonia	R. Potter.	sch. Nelson Bartlett	E. E. Wallace.
Alone	Thos. L. Weiss.	Scandinavian	W. Richardson.	Orlando	J. W. Watts.
Alone	E. A. Brown.	Schiedam	J. Gibson.	bk. Rosita	Chas. Knaebel.
Alone	A. C. Brunn.	Seythia	F. Reuter.	bk. Sarah	D. O. Holberg.
Alone	A. D. Hadley.	Servia	John Park.	sp. Shakere	L. B. Hale.
Alone	R. Ringk.	Siberian	K. Mensonides.	bk. Sodium	Carl Muller.
Alone	J. Hedderwick.	Slavonia	T. Roberts.	sch. Stephen Bennett	Wm. Manson.
Alone	R. T. Jones.	Spain	H. McKay.	bk. Valona	F. A. Magunc.
Alone	M. Murphy.	State of Georgia	R. F. Moore.	bk. Vitez	H. Andrews.
Alone	C. W. Miller.		W. A. Griffiths.	sch. Warren Adams	Paolo Drobay.
Alone	W. Kuhlwein.		G. Moodie.	bk. Yuba	C. A. Colcord.
Alone					J. McKenzie.

UNITED STATES SIGNAL SERVICE

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INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for June, 1888, and is based upon the reports of regular and voluntary observers of both countries. Descriptions of the storms that occurred over the north Atlantic Ocean are also given, and their approximate paths shown on chart i, on which also appears the distribution of icebergs and field-ice and the limits of fog-belts west of the fortieth meridian. The weather over the north Atlantic was unusually fine, and the depressions traced were deficient both in number and energy when compared with June average.

Over a large part of the country the mean temperature differed but slightly from the normal. The greatest deficiency occurred in the west gulf states and on the middle Pacific coast, and the greatest excess in the southern Rocky Mountain districts, Saint Lawrence Valley, and lower lake region.

The rainfall was largely in excess of the average in the northern districts from Lake Superior westward to the Pacific coast, and in the west Gulf states. It was decidedly below the average in the upper lake region, New England, the south

Atlantic states, and in the southern plateau. Elsewhere the departures from the average were not especially marked.

In the preparation of this REVIEW the following data, received up to July 20, 1888, have been used, viz., the regular tri-daily weather-charts, containing data of simultaneous observations taken at 133 Signal Service stations and 22 Canadian stations, as telegraphed to this office; 175 monthly journals and 175 monthly means from the former and 22 monthly means from the latter; 344 monthly registers from voluntary observers; 61 monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the Hydrographic Office, United States Navy, and the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean pressure for June, 1888, determined from tri-daily telegraphic observations of the Signal Service, is shown by isobarometric lines on chart ii.

An area of low mean pressure extends from Arizona and New Mexico north-northeastward to the British Possessions, within which area the barometric means range between 29.72 and 29.80, except over portions of Arizona and New Mexico, where the mean pressure slightly exceeds 29.8. It will be seen from the chart that this isobar of 29.8, showing the region last referred to, is inclosed by the isobar of 29.75, indicating a slight increase of pressure near the centre of the southern portion of the extended area of low mean pressure. To the eastward of the area of least pressure the barometric means increase gradually over the southern districts to 30.0, or slightly above, in the south Atlantic states, the difference between the means over the northern districts from the Rocky Mountains to New England being somewhat less marked. Westward of the area of minimum mean pressure to the Pacific coast the increase of pressure in proportion to the distance is about the same as to the eastward, the highest mean pressure, 29.96, occurring at San Francisco, Cal.

The departures from the normal pressure at the various Signal Service stations are given in the table of miscellaneous meteorological data. Throughout the United States and the adjacent portions of the British Possessions the mean pressure for June is below the normal, the departures being most marked from the Red River Valley of the North westward to the Pacific coast, where they range from .10 to .16, and least in California, where the pressure is nearly normal. East of

the Mississippi the departures are less than .05, except along the Atlantic coast from Virginia northward, where they slightly exceed .05. Over the southwestern portions of the country the pressure ranges from .05 to .09 below the normal.

Compared with the mean pressure of the preceding month, a very slight increase is shown over the central Mississippi valley and Southern States, while in all other districts the pressure for June is lower than that of May, the difference being greatest in the extreme northwest and northern Rocky Mountain slope, where it amounts to from .15 to .20.

BAROMETRIC RANGES.

The monthly barometric ranges at the various Signal Service stations are also given in the table of miscellaneous meteorological data. The monthly ranges are greatest in the extreme northwest and upper Missouri valley, where they exceed 1.00, the maximum, 1.21, occurring at Fort Totten, Dak.; they were, as usual, least along the Gulf and south Pacific coasts, where they were .40 or less, the least, .25, occurring at Key West, Fla. For the states bordering on the Atlantic the extreme ranges are .25 at Key West, Fla., and .73 at Portland, Me.; between the eightieth and ninetieth meridians, .41 at Cedar Keys, Fla., and .79 at Alpena, Mich.; between ninetieth and one hundredth meridians, .33 at Brownsville and Rio Grande City, Tex., and 1.21 at Fort Totten, Dak.; eastern slope of Rocky Mountains, .43 at Fort Davis, Tex., and .95 at Poplar River, Mont.; plateau region, .33 at Yuma, Ariz., and .71 at Salt Lake City, Utah; Pacific coast, .27 at San Diego, Cal., and .88 at Tatoosh Island, Wash.

AREAS OF HIGH PRESSURE.

Six areas of high pressure were observed within or near the limits of the stations of observation during the month of June, three of which first appeared on the north Pacific coast and were traced to the Atlantic, the general direction of movement being slightly to the south of east. Two areas of high pressure were first observed near the centre of the continent, in the region west of Hudson Bay, and moved in a southeasterly direction, one reaching the south Atlantic coast and the other disappearing in the Saint Lawrence Valley. The month closed with an area of high pressure on the north Pacific coast, apparently moving northward, following the coast.

The following table shows the approximate latitude and longitude in which the centre of each area of high pressure was first and last observed, the highest observed barometer reading attending each, and the average rate of movement in miles per hour:

Number of area.	First observed.		Last observed.		Highest observed barometer reading.	Average hourly movement.
	Lat. N.	Long. W.	Lat. N.	Long. W.		
I.....	52 45	100 35	35 30	75 25	30.36	18.8
II.....	41 30	136 30	35 45	77 30	30.34	25.0
III.....	44 00	122 00	40 00	64 00	30.26	22.9
IV.....	49 15	81 40	46 25	75 50	30.10	16.7
V.....	42 45	127 30	48 00	87 00	30.26	21.0
VI.....	39 45	126 20	47 35	125 00	30.28	22.6

Average rate of progress, 21.2 miles per hour.

I.—The month opened with this area of high pressure central north of Dakota, the barometer being low along both the Atlantic and Pacific coasts. The pressure increased to the south and east during the 1st and 2d, during which time this area extended over the central valleys, attended by generally fair weather throughout the eastern part of the United States, and was preceded by light rains along the Atlantic coast, except in North Carolina where the local rains were heavy. The southeasterly course of this area continued during the 3d and 4th, preceded by showers along the south Atlantic coast, and on the morning of the 5th it was central in eastern North Carolina, the pressure having increased to its maximum, 30.36, as it approached the coast. It apparently moved southward over the Atlantic on the 6th, and the pressure slowly diminished. When this area was observed near the centre of the continent it was inclosed by an isobar of 30.1, and when it reached the south Atlantic coast the bounding was isobar 30.3.

II.—The tri-daily telegraph reports of the 4th indicated the advance of a high area from the north Pacific to the northeastward, the pressure over the Rocky Mountain region being from .3 to .4 below the normal. By the morning of the 5th the pressure had increased from .5 to .7 in twenty-four hours over the northern Rocky Mountain region, when the centre of this area was north of Montana. At this point the direction of movement changed, and after passing over the upper Missouri valley it moved directly east during the 6th and 7th, when it extended over the upper lake region, the pressure increasing during the easterly movement, and reaching a maximum of 30.34 at Marquette, Mich., at the morning report of the latter date, when the centre was near that station. From the upper lake region it moved southeastward, covering the entire Atlantic coast from Maine to Florida, the pressure decreasing with the movement and with its increased area, and it disappeared to the east of the coast line during the 9th.

III.—This was a well marked area of high pressure which was central in Oregon on the morning of the 8th, and moved across the continent with an almost uniform velocity of twenty-three miles per hour, occupying five days in making the transit from the Pacific to the Atlantic coast. During the first twenty-four hours there was an apparent tendency to follow a north-easterly course. It was central in southern Montana on the 9th, and extended over the central valleys during the 10th and 11th, inclining to the southeastward until the centre

reached the Mississippi Valley, after which the movement was directly to the east, with increasing pressure at the centre. The maximum pressure, 30.26, was observed on the New England and middle Atlantic coasts on the 13th, when the centre was near, and to the east of, the coast line. It disappeared during the 14th, apparently moving in an easterly direction, but leaving the pressure above the normal over the south Atlantic states.

IV.—The barometer continued generally below the normal over the northern portions of the United States from the 15th to 18th, when a ridge of relatively high pressure formed between storms which were central in the lower Saint Lawrence and upper Missouri valleys, respectively. This distribution of pressure became more marked during the 18th, and the high pressure was apparently re-enforced from the Hudson Bay region. On the morning of the 19th this area was central over the Saint Lawrence Valley. It developed but little energy and caused no marked changes in the weather conditions within the United States, and disappeared on the 19th. The maximum pressure for this area was 30.1, at Rockcliffe, Ont., on the morning of the 18th.

V.—This area of high pressure extended over the north Pacific coast and California on the 20th, the centre being apparently to the west of Oregon. It extended over the plateau regions during that day while the centre moved northward to Washington Territory, where it was located on the morning of the 21st. It probably passed northward beyond the limit of the chart, but on the succeeding day, the 23d, it was probably observed central north of Montana, from which region the movement was to the eastward north of the stations of observation. It was approximately located as central north of Manitoba on the 25th, and north of, and near, Lake Superior on the 26th, and during the three succeeding days it moved slowly to the southeastward, reaching the New England coast on the 28th, after which it was apparently re-enforced from the westward, and the centre of greatest pressure was transferred to the upper lake region and Ohio Valley. The maximum pressure, 30.26, was observed at stations in the Saint Lawrence Valley and on the New England coast, when the centre was located over New England on the 28th.

VI.—This area was apparently advancing northward along the coasts of California and Oregon on the 30th, the centre remaining to the west of the coast line and being near the mouth of the Columbia River at midnight of the 30th. The pressure increased .2 at Portland, Oregon, during the twenty-four hours ending with the afternoon of the 29th. The maximum pressure, 30.28, occurred on the 30th at three stations on the north Pacific coast. The history of the subsequent movements of this area will be given in the REVIEW for July.

AREAS OF LOW PRESSURE.

The following table shows the latitude and longitude in which each area of low pressure was first and last observed, the lowest pressure observed within each area, and the average velocity in miles per hour:

Number of area.	First observed.		Last observed.		Lowest observed barometer reading.	Average hourly velocity.
	Lat. N.	Long. W.	Lat. N.	Long. W.		
I.....	41 20	71 30	49 40	59 15	29.56	41.7
II.....	50 00	127 00	47 25	72 00	29.24	20.7
III.....	39 30	111 45	39 00	101 40	29.36	15.4
IV.....	41 50	116 20	48 30	66 00	29.36	21.5
V.....	51 10	111 15	52 00	100 45	29.36	18.8
VI.....	54 00	115 00	47 00	60 00	29.02	29.2
VII.....	48 00	120 00	54 30	97 00	29.36	37.5
VIII.....	40 00	116 00	53 00	93 00	29.06	10.5
IX.....	43 30	78 00	44 30	60 00	29.60	16.1
X.....	39 15	107 30	37 35	74 00	29.60	22.2
XI.....	42 00	115 00	41 50	103 10	29.48	9.7
XII.....	46 30	72 45	43 00	68 15	29.68	52.0

Average rate of progress, 24.6 miles per hour.

Chart i exhibits the tracks of the centres of the areas of low pressure which were observed during the month of June and

shows an abnormal distribution of these disturbances, a number of which either developed within the Rocky Mountain region or remained almost stationary in that region for several days previous to their disappearance to the northward, without passing to the east of the Mississippi Valley. Of the eleven areas of low pressure traced on the chart, three reached the Atlantic coast, passing to the north of the Ohio Valley; three minor disturbances developed in the northeast portions of the United States; and two were traced from the north Pacific eastward, passing northward of the boundary line and causing but slight changes in the weather conditions within the United States.

The following are general descriptions of the weather conditions attending each area of low pressure, with the general directions of movement while within the limits of the stations of observation:

I.—The month opened with the pressure abnormally low on the Atlantic coast, with indications that a disturbance was forming off the middle Atlantic coast. During the succeeding twenty-four hours this disturbance moved northward to the lower Saint Lawrence valley and thence to the northeastward, without unusual energy, although the wind reached a velocity of thirty-six miles per hour at Father Point, Quebec, when the centre was near that station at midnight of the 1st. The barometer remained almost stationary during the north and northeasterly movement, and the depression apparently increased in area during the 2d, when it disappeared to the eastward. The lowest observed barometer reading, 29.56, was noted at Block Island, R. I., on the morning of the 1st.

II and II a.—This storm was central on the morning of the 1st northwest of Washington Territory and it moved slowly eastward during the first three days of the month, extending southward and including the plateau and Rocky Mountain regions within its limits. A secondary disturbance formed over Utah to the south of the centre of the principal disturbance during the 3d, and after moving eastward joined the main centre in the upper Missouri valley on the morning of the 4th. The barometer fell from 29.79 to 29.24 during the passage of the centre of this area from the Pacific coast to northern Dakota, and general rains occurred as far south as central California and over the northern and central Rocky Mountain and plateau regions, with light snows in northern Montana. During the 4th an extended trough of low pressure covered the eastern slope of the Rocky Mountains while the centre of the disturbance moved eastward toward Lake Superior. A secondary disturbance which formed in the southern portion of this low pressure was replaced on the 5th by an area of high pressure which extended over the Missouri Valley. This storm reached its maximum energy while central in Dakota, and after passing to the east of that region the pressure at the centre increased and it disappeared as a cyclonic disturbance while central over the Saint Lawrence Valley. Strong winds were reported in the lower lake region and on the New Jersey and southern New England coasts, the maximum velocity reaching 40 miles per hour on the afternoon of the 6th, when the disturbance was near Montreal, Quebec. This storm was within the limits of observation during six days, the centre being approximately located at each telegraphic report during that period. It passed over fifty-five degrees of longitude, and the pressure at the centre was approximately the same, 29.79, when it disappeared as it was when first observed, but during the transit near the central portion of the track it had declined to 29.24.

III.—This depression covered the plateau regions from Arizona to Washington Territory on the 6th. It moved slowly eastward, attended by light rains on the Pacific coast north of San Francisco on the 6th and 7th, and these rains extended eastward over the northern and central Rocky Mountain stations as the centre of disturbance passed over Utah and Wyoming territories. The minimum pressure attending this disturbance, 29.36, was observed at Denver, Colo., at midnight of 7th when the centre was near that station. This dis-

turbance covered the entire eastern slope of the Rocky Mountains and central valleys during the 8th, attended by rain, which was unusually heavy in northern Minnesota and eastern Dakota, at stations north of the centre of disturbance. Heavy local rains and severe local storms also occurred in the Mississippi and Missouri valleys and upper lake region during the 9th while the centre of disturbance was moving slowly from Minnesota to northern Wisconsin. After passing over the Lake region the winds shifted to westerly with increasing force at Lake stations, a maximum velocity of 40 miles occurring at Port Huron, when the centre of disturbance was near Rockliffe, Ontario. It was attended by general showers in the Northern States while it passed over the Saint Lawrence Valley and northern New England, but the strongest winds attending it occurred in the Lake region. The pressure within this disturbance oscillated, there being two periods of barometric minima, the pressure declining while the centre was passing from Nevada to eastern Colorado, and from the upper lake region to the lower Saint Lawrence valley.

IV, V, and VI.—These were minor disturbances which possibly originated on the north Pacific coast and passed to the region north of Montana between the 10th and 16th. The centres of these disturbances have only been approximately located on chart i, and they disappeared to the northward of the Lake region, attended by local rains, however, in the northwestern states and in the Lake region, but producing no marked changes in the weather conditions in the remaining portions of the country. An extended trough of low pressure covered the eastern slope of the Rocky Mountains after low area vi passed to the north of Minnesota, but this was replaced by a gradual increase of pressure over the central valleys on the morning of the 17th.

VII.—This disturbance originated over the plateau region, where it apparently formed during the 16th, central in Nevada but extending from Arizona to British Columbia. It moved northeastward from Nevada to British America north of Montana, the barometer at the centre falling from 29.54 to 29.26. It extended eastward, covering the eastern slope of the Rocky Mountains and Mississippi Valley, remaining almost stationary from the 18th to the 22d, attended by severe storms and heavy local rains from the west Gulf coast northward to Lake Superior, Minnesota, and Dakota. Secondary disturbances formed in the southern portion of this depression and disappeared quickly after the principal centre moved north of Dakota. On the morning of the 21st the minimum pressure, 29.06, was observed in northern Dakota. The depression was almost circular in form and well defined, being bounded by isobars of 29.1, 29.2, 29.3, 29.4, 29.5, and 29.6, covering the region from Lake Superior to central Montana, and from the northern boundary southward to central Nebraska. The disturbance moved northeastward from Dakota and was last observed on the morning of the 23d, the centre being far to the north of Lake Superior. The continued southerly winds and high temperature which attended this disturbance in the districts east of the Mississippi were followed by numerous local rains from the Lake region southward to the Gulf coast. When this storm was central north of Dakota on the 22d a second low area appeared in the lower Saint Lawrence valley and moved slowly eastward during the 22d and 23d, leaving a slight secondary disturbance over northern New England which was attended by dangerous winds of short duration from Block Island to Eastport on the night of the 23d.

VIII.—The disturbance last named left the pressure over the northern and eastern portions of the United States about .2 below the normal, the pressure being greatest east of New England and in the Mississippi Valley. This disturbance formed over the middle Atlantic states, central in New York on the 24th, causing severe local storms in New England and New York. It was at no time clearly defined as a barometric depression, but from the tri-daily reports the general movement of the centre was to the northward, crossing the lower Saint Lawrence valley and afterwards moving southeastward

over northern New England and Nova Scotia, disappearing to the eastward on the 27th.

IX.—This storm is the only one of the month which passed over the central portion of the United States. It was located as central in Colorado at midnight of the 25th and passed directly eastward, causing very heavy rains in the central valleys on the 26th and 27th. Severe local storms were reported in the Gulf States on the last-named date, with dangerous winds on the Gulf coast, which were apparently due to a secondary disturbance which formed in the lower Mississippi valley on the 26th, but which disappeared by a gradual increase of pressure after the centre of the principal disturbance reached the Ohio Valley. General rains occurred throughout the Southern and Northern States during the passage of this disturbance. On the afternoon of the 28th numerous local storms were reported in the middle Atlantic states, Ohio Valley, and southern New England. Minor depressions were formed near Lake Erie, in eastern Virginia, and in the upper Ohio valley. Rain continued on the middle Atlantic and New England coasts on the 29th, attended by strong northeasterly winds, which reached a maximum velocities of forty-four miles per hour at Sandy Hook, forty miles at

Block Island, and thirty-five miles at Atlantic City. The centre of this disturbance was last observed off the middle Atlantic coast on the 29th.

X.—Number x formed over the central plateau region on the 27th, and after moving to the central Rocky Mountain region apparently receded to the westward, after which it developed energy and moved in a northeasterly direction over Wyoming, and on the last day of the month it extended over the slope of the Rocky Mountains as a trough of low pressure, the centre being in western Nebraska.

XI.—This disturbance apparently approached the lower Saint Lawrence valley from the Hudson Bay region. The pressure decreased at the northeastern Canadian stations on the night of the 29th, and on the afternoon of the 30th there was a well-defined low area central in the Saint Lawrence Valley near Quebec. It passed southeastward over New England, and at midnight of the 30th general rains prevailed on the New England coast and dangerous winds occurred on the southern New England coast, the centre of disturbance being east of Portland and south of Eastport, Me. Between the afternoon and midnight of the 30th a maximum velocity of fifty miles per hour occurred at Block Island, R. I.

NORTH ATLANTIC STORMS FOR JUNE, 1888.

[Pressure in inches and millimetres; wind-force by Beaufort scale.]

The paths of the depressions that appeared over the north Atlantic Ocean during June, 1888, have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels, received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Nine depressions have been traced, of which six advanced eastward over or near Newfoundland; one first appeared north of the Azores; one apparently moved southeastward from Greenland; and one originated off the southern edge of the Banks of Newfoundland. The depressions generally pursued normal east-northeast tracks, with a rather slow rate of progression.

The month opened with moderate to fresh gales over the entire ocean, attending the presence of two areas of low pressure located, respectively, to the northward of the Azores and on the middle Atlantic coast of the United States; over the southern portion of the British Isles the barometer was relatively high. From the 2d to the 4th, inclusive, the weather conditions continued unsettled, after which there was an apparent west to east translation of high barometric pressure until the 10th. From the 11th to the 14th fresh to strong gales prevailed from Newfoundland to the British Isles, which conditions were succeeded by an area of high pressure which extended eastward from the American coast during the 15th and 16th. During the balance of the second decade the barometer continued high east of the twentieth meridian, while in the vicinity of Newfoundland and the Grand Banks storms of moderate strength were encountered. From the 20th to the 25th generally fair weather prevailed over the British Isles; to the westward of the twentieth meridian this period was marked by fresh increasing to strong gales, and low barometric pressure. Subsequent to the 25th the winds were cyclonic off the west-central coast of Europe, attending the slow eastward passage of an area of low pressure. Over the ocean west of the thirtieth meridian the severest storms of the month occurred from the 26th to the 30th, inclusive, when barometer readings ranging to about 29.20 (741.7) were reported off the northeast edge of the Banks of Newfoundland.

In June, 1887, thirteen depressions were traced, of which one traversed the ocean from coast to coast; two appeared to the northward of the West Indies; two passed eastward over Newfoundland; one apparently originated southwest of the British Isles and moved northward; and eight developed over

mid-ocean. The progressive movement of the depressions was northeastward east of the thirtieth meridian, while to the westward of that longitude their course of direction was irregular. With the exception of rather strong summer gales to the westward of the twenty-fifth meridian during the second decade of the month, the general character of the weather over the north Atlantic was settled and seasonable. The lowest barometric reading reported in the trans-Atlantic routes was 29.30 (744.2), on the 15th, in N. 42° 53' W. 57° 31'.

As compared with the corresponding month of previous years, the general character of the weather over the north Atlantic Ocean during June, 1888, was seasonable. The depressions which appeared were deficient in number, and storms of marked strength were not reported save during the last few days of the month. The development of storms in the tropical or sub-tropical regions of the West Indies and the Gulf of Mexico was not indicated.

In the following descriptions of the depressions traced positions are given in degrees, latitude and longitude, except in cases where twenty-five to thirty-five minutes are cited, when they are shown in degrees and half degrees:

1.—This storm was a continuation of depression number 11 traced for May, 1888, and was central June 1st in about N. 44°, W. 30°, with pressure falling below 29.40 (746.7), and fresh to strong gales; by the 3d the storm-centre had advanced northeast to the twentieth meridian, with an appreciable diminution in energy, after which it recurved southeastward, and disappeared in the direction of the Bay of Biscay after the 4th.

2.—This depression apparently originated off the middle Atlantic coast of the United States during the 2d, whence it moved northeast to N. 41°, W. 63° by the 3d, with pressure about 29.80 (756.9); by the 4th the centre of depression had passed north-northeast to Newfoundland, and thence moved eastward to the forty-second meridian by the 5th. During the next three days the depression pursued a course to the southern extremity of Ireland, where it was central on the 8th, attended by a gradual decrease in barometric pressure, and moderate to fresh gales, after which it disappeared beyond the region of observation.

3.—This depression was a continuation of land low area number i which passed eastward over the Gulf of Saint Lawrence and Newfoundland during the 2d; on the 3d the storm was central in N. 50°, W. 43°, whence it advanced to N. 51°,

W. 38° by the 4th, without evidence of marked energy. Subsequent to the 4th the depression recurved to the southwest and apparently united with depression number 2 which had moved eastward from Newfoundland during that date.

4.—This depression is first located in N. 56°, W. 24°, under date of the 11th, whence it had advanced from the northwestward. On this day minimum pressure about 29.50 (749.3) was indicated, and moderate to fresh gales prevailed east of the fortieth meridian; by the 12th the storm-centre had moved to about N. 58°, W. 16°, with a marked decrease in pressure, after which it advanced beyond the region of reports.

5.—This depression passed east-northeast from Newfoundland during the 12th, and was central on the 13th in about N. 54°, W. 41°; from thence it moved south of east to N. 52°, W. 25° by the 14th, after which it disappeared to the northward, being unattended throughout by noteworthy features.

6.—This depression was a continuation of land low area number v which advanced eastward over the Gulf of Saint Lawrence during the 16th; on the 17th the storm was central over Newfoundland, whence it passed southeast over the Grand Banks by the 18th, with minimum pressure about 29.70 (754.4); from this position the storm-centre moved northeast to N. 51°, W. 43° by the 19th, where it remained nearly stationary during that and the succeeding date, after which it advanced to the thirty-second meridian, and, subsequent to the 21st, disappeared to the northward.

7.—This depression apparently developed off the southern edge of the Banks of Newfoundland during the 21st, and moved northeast to N. 45°, W. 44° by the 22d, where minimum pressure about 29.70 (754.4) was shown; by the 23d the centre of disturbance had advanced northeast to N. 51°, W. 36°, with a decrease of about .30 of an inch in central pressure, after which it recurved westward and apparently united with depression number 8 which had advanced from Newfoundland.

8.—This depression moved eastward over the northern extremity of Newfoundland during the morning of the 23d, and by the 24th had advanced eastward to the fortieth meridian, where pressure ranging to about 29.20 (741.7) and strong to whole gales were reported; by the 25th the storm-centre had passed to N. 53°, W. 31°, with an apparent slight decrease in pressure, after which it recurved to the northwest and remained nearly stationary in the vicinity of the fifty-fifth parallel during the two succeeding dates. Although the generally stormy weather and low barometric pressure which prevailed over the eastern portion of the ocean subsequent to the 26th would seem to indicate an eastward movement of this depression, reports at hand will not admit of determining its track east of the thirtieth meridian.

9.—This depression first appeared to the southward of Nova Scotia on the 27th, whence it moved rapidly east-northeast over the Banks of Newfoundland by the 28th, and remained nearly stationary in about N. 47°, W. 45° during that and the following date, with minimum pressure about 29.40 (746.7), and fresh to strong gales; by the 30th the centre of depression had advanced to N. 51°, W. 41°, with an apparent decrease in pressure and strong to whole gales to the fortieth parallel.

OCEAN ICE.

On chart i the following positions of icebergs and field ice reported during the month are shown by ruled shading:

1st.—S. S. "Lake Superior," off Cape Race, several large bergs; s. s. "Wandrahm," from Cape Race to Cape Saint Mary, several bergs; s. s. "Suez," off Cape Race, bergs.

2d.—S. S. "Siberian," N. 46° 00', W. 51° 30', three huge bergs, and in N. 46° 30', W. 54° 30', four large bergs and pieces.

3d.—S. S. "Barcelona," Cape Race to 30 miles west of Cape Saint Mary, numerous large bergs 15 miles off land.

4th.—S. S. "Oregon," N. 46° 48', W. 56° 06', huge bergs; s. s. "Sarmatian," 10 miles south of Cape Race, four large bergs; s. s. "State of Pennsylvania," N. 47° 02', W. 48° 37', a large berg and several pieces.

5th.—S. S. "State of Pennsylvania," N. 47° 00', W. 48° 36', a large berg; bark "Moselle," from Cape George to Pictou Island, solid field ice.

6th.—S. S. "Nova Scotian," N. 47° 36', W. 52° 35', to Saint John's, Newfoundland, several bergs.

7th.—S. S. "Nova Scotian," Saint John's to Cape Pine, bergs, the last one in N. 46° 22', W. 53° 30'; s. s. "Sarmatian," off Cape Race, three large bergs.

9th.—S. S. "Portia," Saint John's to Cape Race, numerous bergs; s. s. "Buenos Ayrean," N. 46° 40', W. 52° 34', a berg; s. s. "Toronto," N. 46° 50', W. 53° 00', several medium bergs.

10th.—Several icebergs off the harbor of Saint John's, Newfoundland; s. s. "Greetlands," Saint John's Harbor to Cape Race, numerous bergs; s. s. "Concordia," off Cape Race, two small bergs; s. s. "Borean," N. 46° 23', W. 52° 54', a small berg, N. 46° 27', W. 52° 43', a large berg, N. 46° 32', W. 52° 27', a large berg.

12th.—Schr. "Dove" crushed by ice off Cape John.

13th.—S. S. "Coventry," Cape Race in sight wnw., true, twenty bergs; s. s. "Ontario," fifty miles east of Cape Race to Cape Race, numerous bergs.

14th.—S. S. "Minnesota," N. 43° 38', W. 43° 24', several bergs, N. 46° 43', W. 52° 05', a berg; s. s. "Phoenician," near Cape Race, several bergs; s. s. "Rhein," N. 43° 38', W. 43° 24', several bergs nw. fifteen miles.

15th.—S. S. "Bengore Head," N. 47° 43', W. 51° 52', to Cape Pine nw., bergs.

16th.—S. S. "Sarnia," N. 46° 39', W. 52° 54', several medium sized bergs.

17th.—S. S. "Grecian," N. 46° 59', W. 51° 55', a berg; s. s. "Lake Winnipeg," from 60 miles ene. of Cape Race to Cape Pine, a number of bergs.

18th.—A large iceberg grounded in the narrows at Saint John's, N. F.; s. s. "Siberian," Trepassy Bay, 2 medium bergs; off Cape Race, 20 large and small bergs; 24' ne. from Cape Race, 10 small bergs and smaller ones awash; ship "Loyal," Strait of Belle Isle, a huge berg.

19th.—S. S. "Aleides," Strait of Belle Isle, numerous bergs.

20th.—S. S. "Peruvian," Saint John's to Cape Race, a number of bergs; s. s. "Glendale," N. 46° 34', W. 53° 05', an immense number of bergs.

21st.—N. 45° 07', W. 48° 17', two immense bergs, and in N. 45° 09', W. 48° 05', a large berg; s. s. "Oregon," N. 52° 40', W. 53° 00', a huge berg and several large lumps.

22d.—Straits of Belle Isle reported clear of field ice, but full of bergs; s. s. "Lake Superior," off Cape Race, quantity of small bergs.

23d.—S. S. "State of Pennsylvania," N. 46° 26', W. 52° 42', three large bergs, and in N. 45° 51', W. 53° 52', a large berg; during the 23d and 24th, from N. 46° 26', W. 52° 33', to N. 45° 55', W. 53° 44', four large bergs.

25th.—S. S. "Damara," N. 48° 00', W. 47° 50', an iceberg, and on the following day saw several large bergs on both sides of Cape Race; some aground.

26th.—S. S. "Glendale," from Little Bay along the coast to Cape Race, an immense number of large bergs; some aground.

29th.—S. S. "Montreal," twenty miles east of Belle Isle, two large bergs; encountered a heavy belt of field ice in the straits; was detained six hours in passing through a belt of field ice across the straits from Point Amour to the south shore.

30th.—S. S. "State of Georgia," N. 46° 33', W. 52° 47', to N. 45° 49', W. 54° 54', six bergs; s. s. "Circe," fifteen miles east from Point Amour, heavy field ice; was stopped seven hours by ice, and did not get clear until July 1st, when fifteen miles west from Greenly.

On chart i are exhibited the limits within which ice has been reported for June, 1888. The easternmost and southernmost ice was passed on the 14th in N. 43° 38', W. 43° 24', by the s. s. "Minnesota." Ice was most frequently encountered along the coast of Newfoundland between Saint John's and Cape Pine. From the 18th to the 22d numerous icebergs were

reported in the Straits of Belle Isle, and during the last two days of the month vessels were detained in the Straits by heavy field ice.

As compared with the ice record for May, 1888, the southern limit of ice was about two degrees farther north, while the eastern limit was extended about two degrees. The breaking up of ice to the northward of Newfoundland permitted vessels to effect the passage of Belle Isle Straits during the latter half of the month. Small differences are shown in the aggregate quantity of ice reported along the east and south coasts of Newfoundland and over the Grand Banks.

As compared with the corresponding month of previous years, the southward movement of ice massed to the northward of Newfoundland and along the coast of Labrador has been seasonable, the records showing that the Belle Isle Straits route has usually been available during June. Along the east and south coasts of Newfoundland the ice corresponded closely in quantity with the June average; over the Banks of Newfoundland it was deficient. The southernmost ice reported was over three degrees north of the average southern limit for the month, while the easternmost position in which ice was observed was about one and one-half degrees west of the average eastern limit.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported during the last six years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
June, 1883.....	40 28	51 45	June, 1883.....	48 14	42 43
June, 1884.....	40 42	47 49	June, 1884.....	44 00	45 23
June, 1885.....	39 38	48 12	June, 1885.....	45 14	41 12
June, 1886.....	40 30	53 00	June, 1886.....	49 15	40 00
June, 1887.....	40 40	48 34	June, 1887.....	43 22	39 19
June, 1888.....	43 38	43 34	June, 1888.....	43 38	43 24

FOG.

The limits of fog-belts to the westward of the fortieth meridian are shown on chart i by dotted shading. As compared with the chart of the preceding month, the southern limit of the Newfoundland fog-belt has contracted about one degree, and the number of days for which fog was reported, twenty-three, was six more than the aggregate number of foggy days reported for the preceding month. To the westward of the sixtieth meridian fog was reported for a total of twenty-four days, as compared with twenty-seven days for May.

During the prevalence of fog near Newfoundland, south to east winds preceding or attending the passage of cyclonic areas were noted on sixteen dates; in five instances the winds

were variable, with high barometric pressure, and on two days northwest winds prevailed, with rising barometer. To the southward of Nova Scotia, and off the middle Atlantic coast of the United States, the development of fog was, as a rule, dependent upon the cyclonic circulation of the winds, whereby the moisture laden air from over the Gulf Stream was drawn into that region.

The following are the limits of fog-areas on the north Atlantic Ocean during June, 1888, as reported by shipmasters:

Date.	Vessel.	Entered.			Cleared.		
		Lat. N.	Lon. W.	Time.	Lat. N.	Lon. W.	Time.
1	S. S. Trave.....	40 49	50 40	3 a. m.	40 55	50 30	8 a. m.
1	Brittania.....	40 20	73 07	8 a. m.	New York..		
1-2	Siberian.....	48 00	49 00	6 a. m.	46 30	54 30	2 p. m.
2	Trave.....	41 35	50 00	6 a. m.	41 47	48 20	9-30 a. m.
2	Fog at Saint John's, N. F.						
2-3	S. S. La Gascogne.....	40 30	67 27	7-32 p. m.	40 26	70 47	7-16 a. m.
2-3	Wesland.....	41 35	45 13	10-55 p. m.	40 51	47 07	8-10 a. m.
3	City of Berlin.....	43 43	41 10	11-45 a. m.	43 17	41 45	2-45 p. m.
4	Norrona.....	45 24	62 12	6-50 a. m.	45 15	60 05	6-40 a. m.
4-5	City of Berlin.....	41 35	45 22	4-12 a. m.	40 54	48 00	1-12 p. m.
5	Fog at Saint John's, N. F.						
6	Gellert.....	42 05	45 05		41 26	49 28	
7	S. S. Mair.....	41 54	52 49	3-31 a. m.	42 04	51 15	9-25 a. m.
7-8	Wieland.....	40 32	70 24	11-30 p. m.	40 37	70 00	1 a. m.
8	State of Nebraska.....	47 43	45 53	6 a. m.	46 25	49 05	6-45 p. m.
8	Sch. Nelson Bartlett.....	38 39	72 30	3 a. m.	38 50	72 12	4 p. m.
8	Fog at Saint John's, N. F.						
8	S. S. La Normandie.....	41 50	53 18	4 p. m.			
9	Colorado.....	Sandy Hook.			41 35	53 28	
9	Istrian.....	42 08	59 45	5 a. m.	42 53	63 12	7-20 p. m.
9	Eider.....	42 40	49 20	3-10 a. m.	42 18	53 11	2-33 p. m.
10	Fog at Saint John's, N. F.						
10	S. S. Hekla.....	40 19	71 50		40 24	68 10	
10-11	Rotterdam.....	42 09	45 48	3-02 p. m.	41 00	49 03	5-16 a. m.
11	Baltimore.....	40 12	67 20	10 a. m.	40 06	68 25	5-15 p. m.
11-12	Nova Scotian.....	Halifax.....		8 a. m.	43 02	64 39	4-18 a. m.
11-12	Fog at Saint John's, N. F.						
12	S. S. Rhaetia.....	44 20	44 10	6 a. m.	43 54	48 20	9 p. m.
12-13	Pavonia.....	10' E. Boston		Light.....	42 17	64 25	
13	Rhaetia.....	43 35	54 00	5 a. m.	42 58	54 35	Midnight.
13-14	Hekla.....	42 42	52 55		42 56	51 50	
15-16	Fog at Saint John's, N. F.						
15-16	S. S. Pavonia.....	41 58	52 12	2 p. m.	42 00	48 35	6 a. m.
15-16	Denmark.....	40 54	68 10		40 44	69 05	
16	Galileo.....	41 21	45 34	1-30 a. m.	42 31	48 32	4 p. m.
16-17	Minnesota.....	43 00	59 00	8 a. m.	42 00	65 00	Noon.
17	Venetian.....	43 11	50 51	8 a. m.	42 50	54 58	Midnight.
17	Eider.....	40 25	69 50	4-20 p. m.	40 22	67 30	12-30 p. m.
18	Samara.....	43 43	62 18	7 a. m.	42 40	63 55	1-40 p. m.
18-19	Sch. Annie G. O'Leary.....	43 39	61 02	Noon.....	41 36	60 53	Noon.
19	S. S. Buffalo.....	42 12	59 35	2-30 a. m.	42 16	60 14	5 a. m.
21	Trave.....	40 50	08 40	6 p. m.	Sandy Hook.		
22	Borderer.....	42 18	68 00		42 20	69 30	
22-23	Chateau Lafite.....	40 33	67 40		40 31	70 40	
23	P. Calland.....	42 46	57 20	4-22 p. m.	42 52	56 19	7-46 p. m.
23	La Bretagne.....	41 10	68 20	4 a. m.	40 55	69 40	4 p. m.
23-24	Germanic.....	42 10	51 00	6-30 p. m.	43 00	48 45	1-30 a. m.
24-25	Rugia.....	40 57	64 00	4 p. m.	40 33	70 28	8 p. m.
25	Elbe.....	41 15	61 50	4 a. m.	41 10	62 10	5-10 a. m.
25-26	Westernland.....	40 29	67 33	6-15 p. m.	40 36	70 21	4-15 a. m.
26	Brittania.....	43 48	49 10	10-45 a. m.	43 27	50 19	Noon.
27	City of Richmond.....	41 41	48 20	11-15 a. m.	41 14	49 20	3-15 p. m.
27-28	Brittania.....	41 53	54 20	1 p. m.	41 44	57 30	9 a. m.
28-29	Bavarian.....	44 00	44 54	4 a. m.	42 50	48 50	2 a. m.
30	Bothnia.....	42 31	67 12		42 22	67 51	

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for June, 1888, is exhibited on chart ii by dotted isothermal lines. In the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal, and subtracting when above.

The temperature was above the normal in the central and southern Rocky Mountain and plateau districts, in the lower lake region, Saint Lawrence and Ohio valleys, and in portions of the upper lake region, New England, middle and south Atlantic states; the greatest excess of temperature occurring over the region to the north of Lakes Erie and Huron, and in

western Texas and New Mexico. Elsewhere the month was colder than the average June, the deficiencies of temperature being greatest in northern California and southern Oregon, in the northern portions of Montana and Dakota, and in the lower Mississippi valley and west Gulf states.

The following are some of the most marked departures from normal temperatures at Signal Service stations:

Above normal.		Below normal.	
Santa Fe, N. Mex.....	3.1	Sacramento, Cal.....	4.3
El Paso, Tex.....	3.0	Rio Grande City, Tex.....	3.8
Fort Elliott, Tex.....	2.6	Roseburg, Oregon.....	3.7
Cheyenne, Wyo.....	2.3	New Orleans, La.....	3.7
Yuma, Ariz.....	1.6	San Antonio, Tex.....	3.0
Denver, Colo.....	1.4	San Francisco, Cal.....	3.0
Prescott, Ariz.....	1.4	Shreveport, La.....	2.8

It will be observed from the above table of extreme depart-

ures that with regard to mean temperature the month cannot be rated as exceptional. Over a large part of the country it has closely approached a normal June.

The highest temperature reported from Signal Service stations during the month was 110°, which occurred at Fort McDowell, Ariz. on the 16th and 17th; the lowest, 18°, occurred on the summit of Pike's Peak, Colo., on the 21st, the next lowest being 24°.3 at Saint Vincent, Minn., on the 1st. The highest monthly mean temperature, 85°.6, occurred at Yuma, Ariz., and, with the exception of 35°.1 on the summit of Pike's Peak, Colo., the lowest was 53°.8 at Duluth, Minn. The maximum temperatures which occurred between the 23d and 25th in New England and the middle Atlantic states were unusually high for this month in those districts, and at a number of stations were the highest that have been recorded since their establishment; that at Eastport, Me., on the 23d, 88°, was 6° higher than the previous June maximum of sixteen years, 82°, which occurred in 1884. Unusually high temperatures were also recorded in the Lake region and Ohio Valley from the 17th to 20th, Grand Haven, Mich., reporting 90°.5 on the 18th, which is 2°.5 higher than the previous June maximum (88° in 1874) of 16 years. The maximum temperature at Denver, Colo., on the 28th, 97°.7; was within 1°.3 of the highest previously recorded in June at that station during the last seventeen years.

The minimum temperatures of the 1st and 2d in the extreme northwest, upper Mississippi valley, and upper lake region closely approached, and at a few stations exceeded, the lowest recorded in previous years. The same may be said of the minimum temperatures in the east Gulf states on the 4th. The minimum temperatures at the following stations were lower than any formerly recorded: Saint Vincent, Minn.; Des Moines, Iowa; Grand Haven Mich.; Sandusky, Ohio; Mobile and Montgomery, Ala.

Table of comparative maximum and minimum temperatures for June.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
Alabama.....	Mobile.....	90.1	60.0	100.0	1882	61.0	1879	18
Do.....	Montgomery.....	93.6	55.8	105.5	1881	58.0	1879	16
Arizona.....	Prescott.....	89.0	37.4	102.0	1878	32.0	1880	13
Do.....	Fort Apache.....	95.5	42.1	102.0	1887	33.3	1885	10
Arkansas.....	Fort Smith.....	93.2	56.0	101.0	1882	50.0	1882	6
Do.....	Little Rock.....	92.5	56.0	98.0	1882	55.0	1882	9
California.....	San Francisco.....	79.9	53.2	95.2	1883	48.0	1871	18
Do.....	San Diego.....	76.2	54.0	94.0	1877	50.0	1884	17
Colorado.....	Denver.....	97.7	41.0	99.0	1873	37.0	1883	17
Do.....	Montrose.....	91.8	37.0	92.6	1887	38.2	1885	4
Connecticut.....	New Haven.....	94.1	47.5	92.0	1880	41.4	1884	16
Do.....	New London.....	91.8	50.0	89.0	1880	43.0	1884	17
Dakota.....	Fort Buford.....	99.6	36.0	107.0	1883	30.0	1883	10
Do.....	Yankton.....	95.4	42.8	97.0	1876	38.0	1879	16
Dis. of Columbia.....	Washington City.....	94.1	51.6	102.5	1874	46.5	1873	18
Florida.....	Jacksonville.....	95.8	63.5	100.5	1880	61.7	1884	17
Do.....	Key West.....	88.8	73.1	99.8	1886	68.6	1887	17
Georgia.....	Atlanta.....	93.2	35.3	97.0	1887	54.0	1879	10
Do.....	Savannah.....	95.8	60.0	100.0	1880	58.5	1884	18
Idaho.....	Boise City.....	90.0	39.6	98.6	1885	30.0	1882	11
Illinois.....	Cairo.....	89.1	51.4	96.0	1872	50.0	1877	17
Do.....	Chicago.....	90.0	43.0	98.0	1872	40.0	1875	16
Indiana.....	Indianapolis.....	96.4	45.3	96.0	1874	41.1	1885	16
Indian Ter.....	Fort Sill.....	96.5	54.8	105.0	1881	47.0	1879	11
Iowa.....	Dubuque.....	89.3	42.0	98.0	1874	40.0	1877	15
Do.....	Des Moines.....	88.0	43.4	101.4	1886	43.9	1885	10
Kansas.....	Dodge City.....	96.3	50.0	102.0	1880	40.0	1879	14
Do.....	Leavenworth.....	96.2	47.8	99.0	1875	45.0	1882	16
Kentucky.....	Louisville.....	98.5	51.5	100.0	1874	49.0	1875	16
Louisiana.....	New Orleans.....	93.2	66.5	97.0	1881	65.0	1879	18
Do.....	Shreveport.....	97.0	62.0	104.0	1875	55.0	1877	16
Maine.....	Eastport.....	88.0	40.3	82.0	1884	30.0	1875	16
Do.....	Portland.....	96.5	45.0	94.0	1878	42.0	1875	17
Maryland.....	Baltimore.....	93.9	50.7	97.5	1874	49.0	1873	16
Massachusetts.....	Boston.....	96.2	49.0	98.0	1874	42.0	1884	18
Michigan.....	Marquette.....	93.6	34.6	95.0	1879	31.0	1881	15
Do.....	Grand Haven.....	90.5	39.0	88.0	1874	39.3	1885	10
Minnesota.....	Saint Vincent.....	91.3	24.0	93.0	1883	29.0	1883	8
Do.....	Saint Paul.....	88.7	41.0	94.0	1874	36.0	1885	16
Mississippi.....	Vicksburg.....	92.6	60.0	101.0	1881	53.0	1879	16
Missouri.....	Saint Louis.....	89.5	50.0	99.0	1881	48.0	1877	18
Montana.....	Ft. Assinaboine.....	90.6	31.8	101.0	1883	31.0	1880	7
Do.....	Helena.....	90.0	39.5	95.0	1880	31.0	1880	9
Nebraska.....	North Platte.....	98.5	42.0	101.0	1876	33.0	1876	14
Do.....	Omaha.....	96.2	46.4	98.0	1881	42.0	1877	16
Nevada.....	Winnemucca.....	87.7	38.7	97.7	1887	29.0	1880	9
New Jersey.....	Atlantic City.....	90.5	50.4	89.0	1880	45.0	1878	15
New Mexico.....	Santa Fe.....	87.0	41.5	92.0	1881	33.0	1877	17
New York.....	Buffalo.....	86.0	45.0	92.0	1878	40.5	1879	16
Do.....	New York City.....	96.2	52.2	95.0	1875	47.0	1879	16
North Carolina.....	Charlotte.....	98.0	55.3	101.9	1887	51.5	1884	10
Do.....	Wilmington.....	93.8	52.8	100.0	1880	51.0	1884	18

Table of comparative maximum and minimum temperatures, &c.—Cont'd.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
Ohio.....	Cincinnati.....	96.5	48.4	98.5	1874	48.0	1885	17
Do.....	Sandusky.....	93.4	44.0	96.0	1885	45.9	1885	9
Oregon.....	Portland.....	87.0	47.5	99.0	1876	39.0	1875	16
Do.....	Pittsburg.....	86.0	44.0	97.1	1887	37.5	1880	11
Pennsylvania.....	Roseburg.....	95.2	41.4	98.0	1874	39.0	1879	16
Do.....	Philadelphia.....	97.2	52.2	97.0	1874	47.2	1884	18
Rhode Island.....	Block Island.....	82.6	49.0	82.6	1884	46.2	1884	8
South Carolina.....	Charleston.....	94.8	62.0	100.0	1880	57.4	1887	16
Tennessee.....	Knoxville.....	95.0	49.7	96.0	1880, 1887	47.0	1878	17
Do.....	Memphis.....	93.6	53.8	100.0	1881	54.0	1879	16
Texas.....	Brownsville.....	92.4	67.0	102.0	1878	63.0	1877	13
Do.....	Fort Elliott.....	99.6	53.0	100.0	1880, 1881	44.0	1880, 1882	9
Utah.....	Salt Lake City.....	92.7	45.1	100.0	1883	37.0	1875	15
Virginia.....	Lynchburg.....	95.5	49.7	97.7	1887	49.0	1880	16
Do.....	Norfolk.....	95.6	55.5	102.0	1874	53.0	1884	18
Washington.....	Spokane Falls.....	84.9	44.0	95.4	1883	38.2	1887	8
Do.....	Olympia.....	82.0	42.0	95.0	1878	36.0	1880	11
Wisconsin.....	La Crosse.....	90.4	44.0	98.0	1874	40.0	1876	16
Do.....	Milwaukee.....	87.1	40.5	94.0	1874	39.8	1885	18
Wyoming.....	Cheyenne.....	92.6	36.8	97.0	1880, 1881	28.0	1876	16

RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data. The monthly ranges were greatest, and exceeded 60°, in the extreme northwest and upper Missouri valley; they were, as usual, least along the Gulf and Pacific coasts, where they were below 30°.

The following are some of the extreme monthly ranges:

Greatest.		Least.	
Moorhead, Minn	70.0	Key West, Fla.....	15.0
Poplar River, Mont.....	68.8	Tatoosh Island, Wash.....	15.7
Saint Vincent, Minn.....	66.5	Galveston, Tex.....	20.6
Fort Yates, Dak.....	65.4	Jupiter, Fla.....	30.6
Bismarck, Dak.....	64.4	Fort Canby, Wash.....	21.5
Fort Buford, Dak.....	63.3	San Diego, Cal.....	22.2
Fort Totten, Dak.....	62.9	Corpus Christi, Tex.....	22.7

FROST.

Frosts are reported to have occurred as follows:

Arizona: Whipple Barracks, 8th. **California:** Fort Bidwell, 18th. **Colorado:** Pike's Peak, 11th. **Dakota:** Fort Totten, 1st, 6th; Bismarck, Fort Yates, and Huron, 6th. **Illinois:** Oswego, 2d, 3d; Chicago and Rockford, 3d. **Indiana:** Terre Haute, 2d to 4th; Vevay, 4th. **Iowa:** Grinnell and Sac City, 1st; Dubuque, 1st, 11th; Amana, Ames, Des Moines, Elkhart, Fairfield, Glenwood, Monticello, Osage, Osceola, Oskaloosa, and Vinton, 2d. **Michigan:** Traverse City, 1st, 2d; Birmingham and Mottville, 1st, 3d; Kalamazoo, 2d; Grand Haven, 2d, 11th; Hudson and Port Huron, 3d. **Minnesota:** Moorhead, 1st, 2d; Saint Vincent, 6th; Frankford, 3d. **Montana:** Fort Maginnis, 6th, 24th. **Nevada:** Carson City, 4th, 16th, 18th, 20th, 29th. **New Hampshire:** Mount Washington, 27th, 28th. **New York:** Palermo, 2d to 4th, 8th; Eden, 3d; Humphrey, 3d, 4th. **Ohio:** Napoleon and Toledo, 1st, 3d; North Lewisburg and Wauseon, 1st, 3d, 4th; Tiffin and Westerville, 3d; Elyria, Garrettsville, and Lordstown, 3d, 4th, 12th; Bellevue, 12th, 13th. **Oregon:** Fort Klamath, 5th, 30th; Lakeview and Linkville, 30th. **Pennsylvania:** Wellsborough, 2d to 5th, 12th; Catawissa, Grampian Hills, Pittsburg, and Salem Corners, 4th; Dyberry, 4th, 5th; Eastbrook, 4th, 12th. **Vermont:** Stratford, 3d, 4th, 12th; Northfield, 4th, 12th; Middlebury, 12th; Lunenburg, 30th. **West Virginia:** Parkersburg, 3d, 4th. **Wisconsin:** Deuster and Embarras, 2d; Delavan, 2d, 3d. **Wyoming:** Fort Bridger, 6th; Cheyenne, 10th.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperatures for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for June, 1888; (4) the departures of the current month from the normal;

(5) and the extreme monthly means for June during the period of observations and the year of occurrence:

State and Station.	County.	(1) Normal for the month of June.	(2) Length of record.	(3) Mean for June, 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for June.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
Arkansas.		°	Years	°	°	°		°	
Lead Hill	Boone	75.8	6	76.1	+0.3	80.2	1885	75.4	1886
California.									
Sacramento	Sacramento	70.2	22	66.8	-3.4	77.6	1876	66.2	1884
Connecticut.									
Southington	Hartford	66.0	20	69.0	+3.0	72.7	1870	63.5	1878
Florida.									
Merritt's Island	Brevard	79.5	5	78.3	-1.2	80.6	1884	78.3	1888
Illinois.									
Greenville	Bond	74.0	10	71.8	-2.2				
Golconda	Pope	74.4	10	73.6	-0.8				
Peoria	Peoria	73.5	32	74.4	+0.9				
Riley	McHenry	66.6	27	66.7	+0.1				
Indiana.									
Blue Lick	Clark	71.6	11	70.2	-1.4				
Logansport	Cass	74.0	34	75.2	+1.2				
Vevay	Switzerland	74.1	21	74.2	+0.1				
Iowa.									
Cresco	Howard	66.2	16	67.8	+1.6				
Independence	Buchanan	67.5	13	68.5	+1.0	71.0	1887		
Monticello	Jones	68.4	34	69.9	+1.5	74.0	1856	64.1	1863
Kansas.									
Lawrence	Douglas	73.6	21	73.1	-0.5	77.2	1881	69.8	1878
Wellington	Sumner	74.1	10	75.5	+1.4	78.7	1881	71.3	1883
Louisiana.									
Grand Coteau	Saint Landry	78.7	6	76.7	-2.0				
Maryland.									
Cumberland	Alleghany	69.5	17	70.2	+0.7	74.0	1874	65.0	1875
Massachusetts.									
Somerset	Bristol	69.3	18	69.8	+0.5				
Newburyport	Essex	64.7	10	65.8	+1.1	66.2	1883	59.4	1881
Worcester	Worcester	65.8	50	66.1	+0.3				
Michigan.									
Thornville	Lapeer	68.1	12	68.9	+0.8				
Kalamazoo	Kalamazoo	67.7	13	68.9	+1.2				
Adrian	Lenawee	66.6	11	69.4	+2.8				
Nevada.									
Carson City	Ormsby	64.5	9	61.0	-3.5				
New Jersey.									
South Orange	Essex	69.4	18	69.1	-0.3	73.6	1876	63.4	1881
New York.									
Factoryville	Tioga	66.1	7	67.0	+0.9	68.9	1887	62.3	1885
Palermo	Oswego	65.5	35	64.9	-0.6	71.6	1870	59.4	1855
Humphrey	Cattaraugus	64.3	6	65.0	+0.7	66.2	'84-'87	61.1	1886
Ohio.									
Napoleon	Henry	70.5	5	70.3	-0.2				
Wauseon	Fulton	68.4	18	69.3	+0.9	72.3	1873	65.5	1881
Yellow Springs	Greene	69.1	4	70.9	+1.8	70.9	1888	68.0	1885
Oregon.									
Albany	Linn	61.5	10	61.0	-0.5	64.0	1883	59.1	1880
Eola	Polk	60.0	18	59.2	-0.8				
Pennsylvania.									
Dyberry	Wayne	64.5	22	63.0	-1.5	69.4	1870	60.4	1881
Grampian Hills	Clearfield	66.3	24	67.3	+1.0				
Wellaborough	Tioga	67.6	10	65.5	-2.1	74.3	1883	61.2	1881
South Carolina.									
Stateburg	Sumter	76.3	8	76.5	+0.2	80.5	1881	72.4	1884
Tennessee.									
Milan	Gibson	74.0	6	74.0	0	86.0	1886	62.0	1883
Texas.									
New Uim	Anstett	80.4	16	78.4	-2.0	85.0	1881	78.2	1877
Vermont.									
Strafford	Orange	65.4	14	68.3	+2.9	69.0	1876	58.4	1881
Virginia.									
Bird's Nest	Northampton	74.4	19	73.5	-0.9	77.7	1880	70.2	1875
Variety Mills	Nelson	70.9	11	72.0	+1.1	73.3	1877	67.5	1878
Wytheville	Wythe	68.3	25	71.2	+2.9	73.0	1874	63.9	1878
West Virginia.									
Helvetia	Randolph	66.1	12	66.7	+0.6	69.7	1876	62.1	1878

TEMPERATURE OF WATER.

The following table shows the temperature of the sea-water for June, 1888, observed, under conditions as given, at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

Station.	Temperature at bottom.				Mean temperature of air at the station.	Average depth of water in feet and tenths.
	Max.	Min.	Range.	Monthly mean.		
Canby, Fort, Wash	62.6	57.0	5.0	60.2	57.7	13.8
Cedar Keys, Fla	89.2	80.2	9.0	85.3	80.1	7.8
Charleston, S. C.	84.5	77.5	7.0	81.0	78.2	34.7
Eastport, Me	44.7	41.0	3.7	42.9	54.7	16.5
Galveston, Tex	86.8	76.5	10.3	83.3	80.2	15.1
Key West, Fla	88.9	80.8	8.1	85.5	81.9	17.8
New York City	69.7	60.3	9.4	65.7	71.4	14.8
Pensacola, Fla	84.0	73.0	11.0	81.3	78.4	19.0
Portland, Me	57.5	48.1	9.4	52.3	63.0	15.4
Portland, Oregon	68.5	58.2	10.3	63.7	61.9	43.3

COTTON REGION REPORTS.

In the accompanying table are given for June, 1888, means of the maximum and minimum temperatures, and the average rainfall in the cotton regions, together with normals computed from similar observations of former years:

Temperature and rainfall data for the cotton districts, June.

Districts.	Rainfall.			Temperature.							
	Average for June of six preceding years.	Average for June, 1888.	Departures.	Maximum.				Minimum.			
				Mean for June of six preceding years.		Mean for June, 1888.		Mean for June of six preceding years.		Mean for June, 1888.	
				Departures.	Departures.	Departures.	Departures.	Departures.	Departures.	Departures.	Departures.
	Inches	Inches	Inches.	°	°	°	°	°	°	°	°
New Orleans ..	5.80	4.23	-1.57	90.6	89.2	-1.4	70.2	68.0	-2.2	99	47
Savannah	5.88	4.14	-1.74	89.9	90.7	+0.8	69.4	67.9	-1.5	102	54
Charleston	6.02	3.56	-2.46	88.6	90.9	+2.3	67.2	68.2	+1.0	98	51
Atlanta	5.27	3.91	-1.36	87.4	88.3	+0.9	65.9	66.8	+0.9	102	51
Wilmington	5.35	3.19	-2.13	87.4	86.5	-0.9	65.1	66.9	+1.8	102	46
Memphis	4.51	4.27	+0.24	87.6	86.5	-1.1	66.0	65.9	-0.1	98	46
Galveston	2.72*	7.77	+5.05	92.0*	89.7	-2.3	70.2*	71.4	+1.2	104	58
Vicksburg	4.09	3.24	-0.85	90.1	88.6	-1.5	69.2	67.8	-1.4	95	54
Montgomery	4.85	3.90	-0.95	89.4	89.5	+0.1	67.4	68.0	+0.6	98	50
Augusta	5.33	3.21	-2.12	89.0	90.0	+1.0	66.8	67.5	+0.7	100	54
Little Rock	3.02	5.18	+2.16	90.0	87.2	-2.8	65.7	67.6	+1.9	102	48
Mobile	4.62	5.56	+0.94	91.1	92.2	+1.1	69.0	67.9	-1.1	102	48

* Average for five years.

It will be seen from the above table that in nine of the twelve districts for which means are given, the rainfall was below the average, and that the deficiencies exceeded two inches in the Charleston, Wilmington, and Augusta districts. In the remaining districts there was an excess, that for Galveston being unusually large.

No marked deviations from normal temperature conditions are shown by the above record.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for June, 1888, as determined from the reports of about one thousand stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the geographical districts in columns for mean temperature, precipitation, and departures from the normal, show respectively the average for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal, and subtracting when above.

In the west Gulf states, Rio Grande Valley, over the northern districts from Minnesota westward to the Pacific coast, and in

northern California the rainfall of June, 1888, was in excess of the average. In all other portions of the country the rainfall was below the average. The percentages of excess were greatest in the northern and middle Pacific coast regions, where more than three times the average amount of rain fell, while more than double the average fell in the extreme northwest and northern plateau. In the west Gulf states there was also a marked excess, amounting to about 75 per cent. of the June average for that district. In the east Gulf states the excess was very slight. the rainfall amounted to less than half of the June average in the following named districts: New England, south Atlantic states, Florida, southern plateau, and south Pacific coast region, the normal for these two last named districts for June being about 0.50 and 0.10, respectively. The

proportion of average rainfall in other districts where deficiencies occurred was about as follows: Ohio and lower Missouri valleys 75 per cent; upper lake region and Middle Rocky Mountain slope 60 per cent.; upper Mississippi Valley, lower lake region, and middle Atlantic states, from 85 to 95 per cent.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for June, 1888; (4) the departures of the current month from the average; (5) and the extreme monthly precipitation for June during the period of observations and the year of occurrence:

State and station.	County.	(1) Average for the month of June.	(2) Length of record.	(3) Total for June, 1888.	(4) Departure from average.	(5) Extreme monthly precipitation for June.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
<i>Arkansas.</i>		<i>Inches</i>	<i>Years</i>	<i>Inches</i>	<i>Inches</i>		<i>Inches.</i>		
Lead Hill.....	Boone.....	5.35	6	2.87	-2.48	7.14	1882	2.87	1888
<i>California.</i>									
Sacramento.....	Sacramento.....	0.21	22	0.39	+0.18	1.57	1884	0.00	*
<i>Connecticut.</i>									
Southington.....	Hartford.....	3.03	20	1.53	-1.50	7.42	1877	0.48	1873
<i>Florida.</i>									
Merritt's Island.....	Brevard.....	7.24	11	4.68	-2.56	13.28	1884	3.32	1878
<i>Illinois.</i>									
Golconda.....	Pope.....	4.36	10	7.00	+2.64	.....	.....	.....	.....
Peoria.....	Peoria.....	3.88	32	1.84	-2.04	.....	.....	.....	.....
Riley.....	McHenry.....	3.98	27	0.81	-3.17	.....	.....	.....	.....
Sandwich.....	De Kalb.....	4.16	38	2.76	-1.40	.....	.....	.....	.....
<i>Indiana.</i>									
Logansport.....	Cass.....	3.88	34	3.35	+0.53	.....	.....	.....	.....
Vevay.....	Switzerland.....	5.07	21	1.69	-3.38	8.41	1875	1.36	1873
<i>Iowa.</i>									
Creco.....	Howard.....	4.85	15	3.07	-1.78	.....	.....	.....	.....
Independence.....	Buchanan.....	4.80	12	8.27	-2.53	7.42	1880	3.00	1887
Monticello.....	Jones.....	4.28	34	3.18	-1.10	9.02	1884	0.74	1857
<i>Kansas.</i>									
Lawrence.....	Douglas.....	4.94	21	8.31	+3.37	12.11	1876	1.30	1872
Wellington.....	Sumner.....	4.45	10	4.38	-0.07	7.71	1886	2.43	1887
Yates Centre.....	Woodson.....	4.24	8	4.73	+0.49	8.24	1882	3.46	1884
<i>Louisiana.</i>									
Baton Rouge.....	E. Baton Rouge.....	4.76	26	4.23	-0.53	.....	.....	.....	.....
<i>Maryland.</i>									
Cumberland.....	Alleghany.....	3.45	17	3.76	+0.31	5.84	1880	0.86	1885
<i>Massachusetts.</i>									
Somerset.....	Bristol.....	3.31	18	1.66	-1.65	.....	.....	.....	.....
Newburyport.....	Essex.....	2.60	10	1.59	-1.01	5.94	1879	1.57	1880
Worcester.....	Worcester.....	3.15	50	2.92	-0.23	.....	.....	.....	.....
<i>Michigan.</i>									
Thornville.....	Lapeer.....	3.84	12	3.81	-0.03	.....	.....	.....	.....
Kalamazoo.....	Kalamazoo.....	4.65	13	4.14	-0.51	.....	.....	.....	.....
Adrian.....	Lenawee.....	4.60	11	5.20	+0.60	.....	.....	.....	.....
<i>Nevada.</i>									
Carson City.....	Ormsby.....	0.43	9	0.08	-0.35	1.97	1884	0.05	1886
<i>New Jersey.</i>									
South Orange.....	Essex.....	3.39	18	4.03	+0.64	6.02	1884	1.00	1885
<i>New York.</i>									
Palermo.....	Oswego.....	3.20	35	2.26	-0.94	8.80	1865	0.70	1864
<i>Ohio.</i>									
Wauseon.....	Fulton.....	4.24	16	3.52	-0.72	8.43	1881	1.43	1872
<i>Oregon.</i>									
Albany.....	Linn.....	1.68	10	5.31	+3.63	5.31	1888	0.27	1879
Eola.....	Polk.....	1.25	18	5.06	+3.81	5.06	1888	0.00	1871
<i>Pennsylvania.</i>									
Dyberry.....	Wayne.....	3.14	16	2.07	-1.07	5.38	1883	1.13	1873
Grampian Hills.....	Clearfield.....	4.51	17	2.30	-2.21	7.40	1880	2.01	1887
Wellaborough.....	Tioga.....	3.90	10	3.90	0.00	7.40	1880	2.01	1887
<i>South Carolina.</i>									
Stateburg.....	Sumter.....	3.27	8	2.34	-0.93	5.35	1886	1.38	1881
<i>Tennessee.</i>									
Milan.....	Gibson.....	4.27	6	4.17	-0.10	5.81	1885	2.66	1887
<i>Texas.</i>									
New Ulm.....	Austin.....	3.92	16	10.43	+6.50	11.33	1873	0.51	1885
<i>Vermont.</i>									
Stratford.....	Orange.....	3.36	14	2.50	-0.86	6.03	1876	1.50	1885
<i>Virginia.</i>									
Bird's Nest.....	Northampton.....	3.22	19	4.15	+0.93	8.15	1881	1.00	1882
Variety Mills.....	Nelson.....	3.62	10	3.03	-0.59	6.21	1886	1.46	1880
Wytheville.....	Wythe.....	3.85	25	1.30	-2.55	9.10	1875	1.30	1888
<i>West Virginia.</i>									
Helvetia.....	Randolph.....	6.02	12	2.81	-3.21	8.27	1882	2.81	1888

* 1867, 1876, 1878, 1880, 1883, 1886.

HAIL.

Hail is reported to have fallen as follows: 1st, Colo., Ill., Mo. 2d, Colo., Idaho, Nebr., Ohio, Va., Wyo. 3d, Cal., Dak., Mich. 4th, Dak., Iowa. 6th, Kans., Me., Mass., Nebr., N. Mex., N. Y., Vt. 7th, Me., Mo., N. C. 8th, Dak., Kans., Minn., N. Mex., S. C. 9th, Kans., Oregon. 10th, Mich., N. Mex., N. Y., Oregon, Va., Wyo. 11th, Nebr., N. C., S. C.

12th, Mich., Minn., Mo., Nebr. 13th, Colo., Dak. 14th, Ohio, Vt., Wis. 15th, Dak., N. Y., Pa. 16th, Colo., Md., Minn., N. J., N. Mex., Pa., Tex., Va., W. Va. 17th, Dak., Idaho, Mont., N. C. 18th, Col., Mont., N. Mex. 19th, Kans., Mont., Nev., Oregon, S. C. 20th, Utah, Va. 21st, Ill., Kans. 22d, Kans., Nebr., S. C., Tex., Vt. 23d, Ind. T., Iowa, Kans., N. J., Pa. 24th, Tex. 25th, Nebr. 26th, Mo. 27th, Mont. 30th, Colo., Mass., N. H., Vt.

SLEET.

Sleet was reported as follows: Pike's Peak, Colo., 1st; Linkville, Oregon, 3d, 29th; Wellsborough, Pa., 2d.

SNOW.

Snow is reported to have fallen as follows: Fort Assinaboine, Mont., 4th; Fort Maginnis, Mont., 4th and 5th; Fort McKinney, Wyo., 5th; Pike's Peak, Colo., 2d, 10th, 13th, 14th, 16th, 17th, 19th, 25th. During the month at Summit, Cal., snow fell to the depth of 9.5 inches and at Cisco, Cal., 7 inches; dates not given.

EXCESSIVE PRECIPITATION IN JUNE.

Table showing for the month of June monthly rainfalls of 10 inches, or more (in states where monthly rainfalls did not reach 10 inches the station reporting the maximum amount is given); rainfalls of 2.50 inches, or more, in any 24 consecutive hours; and rainfalls equaling or exceeding one inch in one hour.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
<i>Alabama.</i>		<i>Inches.</i>			<i>Inches</i>			<i>h. m.</i>	<i>Inches</i>
Auburn.....	1888	12.30	1888	26-27	2.70	.....	.....	.....	.....
Evergreen.....	1888	12.30	1888	27	5.50	.....	.....	.....	.....
Fort Deposit.....	1888	12.30	1888	27	3.00	.....	.....	.....	.....
Greenville.....	1883	10.28	1883	10	3.03	.....	.....	.....	.....
Do.....	1886	10.08	1885	16	3.98	.....	.....	.....	.....
Do.....	1885	.....	1885	23	2.55	.....	.....	.....	.....
Livingston.....	1888	27-28	1888	27-28	2.96	.....	.....	.....	.....
Mobile.....	1888	13.56	1873	9-10	2.71	.....	.....	.....	.....
Do.....	1877	.....	1877	14	4.37	.....	.....	.....	.....
Do.....	1883	.....	1883	22	2.55	.....	.....	.....	.....
Do.....	1887	.....	1887	21	3.26	.....	.....	.....	.....
Do.....	1888	.....	1888	26-27	8.50	.....	.....	.....	.....
Montgomery.....	1873	11.08	1878	12-13	4.03	1876	13	0 43	1.10
Do.....	1884	10.26	1885	22	2.57	.....	.....	.....	.....
Do.....	1888	.....	1888	26-27	3.09	.....	.....	.....	.....
Mount Vernon Barracks.....	1888	.....	1888	27	4.50	.....	.....	.....	.....
New Market.....	1888	.....	1888	10	3.30	.....	.....	.....	.....
Scottsborough.....	1888	.....	1888	27	2.75	.....	.....	.....	.....
<i>Arizona.</i>									
Bowie, Fort.....	1886	4.21	.....	.....	.....	.....	.....	.....	.....
Grant, Fort.....	1886	.....	1883	29	1 00	1.26	.....	.....	.....
<i>Arkansas.</i>									
Eureka Springs.....	1888	.....	1888	8-9	3.40	.....	.....	.....	.....
Fayetteville.....	1888	.....	1884	16	2 00	2.00	.....	.....	.....
Hot Springs.....	1888	.....	1888	22	3.00	.....	.....	.....	.....
Little Rock.....	1879	.....	1881	9	1 00	1.75	.....	.....	.....
Do.....	1881	.....	1881	24	0 50	1.00	.....	.....	.....
Do.....	1886	.....	1886	15	2.77	1888	27	1 05	1.05
Madison.....	1884	.....	1886	2	3.50	.....	.....	.....	.....
Magnolia.....	1888	.....	1886	15	2.50	.....	.....	.....	.....
Ozone.....	1888	10.36	.....	.....	.....	.....	.....	.....	.....
Russellville.....	1886	.....	1886	12	2.50	.....	.....	.....	.....
<i>California.</i>									
Bidwell, Fort.....	1884	4.20	.....	.....	.....	.....	.....	.....	.....
Red Bluff.....	1884	.....	1888	3	0 25	0.51	.....	.....	.....
<i>Colorado.</i>									
Denver.....	1882	4.96	.....	.....	.....	.....	.....	.....	.....
Las Animas.....	1882	.....	1882	11	1 00	1.25	.....	.....	.....
<i>Connecticut.</i>									
Canton.....	1862	12.36	.....	.....	.....	.....	.....	.....	.....
Do.....	1869	11.77	.....	.....	.....	.....	.....	.....	.....
Colebrook.....	1874	14.50	1874	7-8	7 40	.....	.....	.....	.....
Do.....	1876	.....	1876	21	2.87	.....	.....	.....	.....
Do.....	1879	.....	1879	3	2.50	.....	.....	.....	.....
Mystic.....	1877	.....	1877	7-8	2.81	.....	.....	.....	.....
New Haven.....	1884	.....	1884	25-26	4.09	.....	.....	.....	.....
Do.....	1887	.....	1887	23-24	2.74	.....	.....	.....	.....
New London.....	1875	.....	1882	24	1 30	1.69	.....	.....	.....
Do.....	1877	.....	1877	6-7	4.22	.....	.....	.....	.....
Do.....	1879	.....	1879	2-3	2.51	.....	.....	.....	.....
Do.....	1884	.....	1884	25-26	5.97	.....	.....	.....	.....
Southington.....	1887	.....	1887	23-24	3.80	1879	29	0 15	1.45
Voluntown.....	1884	.....	1884	25-26	4.50	.....	.....	.....	.....
<i>Dakota.</i>									
Abercrombie, Fort.....	1872	10.15	1872	30	3.50	.....	.....	.....	.....
Do.....	1874	.....	1874	23	3.14	.....	.....	.....	.....
Bismarck.....	1888	.....	1888	8-9	2.54	.....	.....	.....	.....
Buford, Fort.....	1885	.....	1885	6	3.23	1874	6	1 00	1.40
Deadwood.....	1874	.....	1874	9-10	2.51	.....	.....	.....	.....
Do.....	1883	.....	1883	23-24	3.34	.....	.....	.....	.....
Pembina, Fort.....	1877	.....	1877	22	3.24	.....	.....	.....	.....
Philip Kearney, Fort.....	1868	14.20	1868	4-5	4.10	.....	.....	.....	.....

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.		Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.
<i>Dakota—Continued.</i>		<i>Inches.</i>			<i>Inches.</i>			<i>A. m.</i>
Randall, Fort	1875	12.82	1875	30	5.10	1873	28	0 15
Do.		1875	18	4.85	1875	14	0 45	1.10
Do.		1885	1	2.80	1878	23	1 30	2.20
Ransom, Fort		1872	25-26	2.65				
Rapid City		1869	28-29	3.50	1888	7	0 13	0.27
Sully, Fort		1886	13	3.19				
Do.		1871	4	4.02				
Totten, Fort		1875	1	2.80				
Do.		1887	15-16	2.55				
Do.		1888	8-9	2.64				
Wadsworth, Fort	1867	13.80	1867	23	2.50			
Webster					1884	24	0 20	1.33
Do.					1885	3	2 00	2.22
Do.					1886	14	3 15	3.65
Yankton					1875	18	1 15	1.73
Do.					1875	30		
<i>Delaware.</i>								
Delaware Breakwater	1883	4.09						
Dover			1878	17-18	3.00			
Do.			1879	3-4	2.80			
<i>District of Columbia.</i>								
Washington City	1883	8.55						
<i>Florida.</i>								
Alva	1888	11.36	1888	15	4.50	1888	15	4 00
Archer	1884	11.66						
Do.	1886	12.55						
Barrancas, Fort	1878	13.88	1869	15	3.76	1879	25	1 35
Do.	1879	10.49	1874	22	2.60			
Do.	1884	11.99	1874	23	2.63			
Do.			1875	15	3.25			
Do.			1878	30	3.00			
Do.			1878	14	3.05			
Do.			1879	8	3.92			
Do.			1879	28-29	4.82			
Do.			1880	22	2.73			
Biscayne	1878	14.30						
Cedar Keys	1885	10.98	1880	3	2.98	1880	3	1 06
Do.			1882	8-9	3.21	1880	28	0 32
Do.			1883	25-26	2.53	1885	12	1 35
Do.			1885	5	3.38			
Do.			1886	22	2.77			
Daytona						1875	8	1 00
Do.						1877	24	1 00
Fernandina	1884	28.86						
Jacksonville			1872	2-5	2.95	1872	21	0 00
Do.			1877	11-12	3.46	1875	26	0 31
Do.			1877	12-13	2.52	1885	10	4 43
Do.			1885	10-11	5.12			
Do.			1887	26-27	3.01			
Jupiter						1888	20	0 45
Key West	1876		1876	7-8	3.02	1879	10	1 20
Do.			1887	15	3.57	1886	12	0 28
Do.						1888	15	1 15
Merritt's Island	1880		1880	21	2.70	1884	11	2 15
Do.			1882	9	3.85	1885	1	1 30
Do.			1884	11	3.97	1885	11	2 22
Do.			1885	11	3.26	1886	23	0 45
Do.						1888	20	1 30
Pensacola	1887	14.11	1883	10	2.67	1887	20	4 00
Do.			1887	29	10.70			
Do.			1888	26-27	4.67			
Sanford	1886	11.08				1888	29	0 15
Sebastian								
Saint Mark's			1879	9	5.24			
Titusville						1888	25	0 30
Do.						1888	27	1 00
Do.						1888	30	1 00
<i>Georgia.</i>								
Alapaha	1886	10.93						
Athens	1884	10.47				1887	21	3 00
Atlanta	1874	10.73				1882	15	1 00
Augusta						1882	27	1 00
Do.						1888	26	0 10
Do.						1888	27	0 05
Bainbridge	1886	10.68	1886	30	2.73			
Cartersville	1886	10.47						
Columbus			1886	4	2.96			
Dalhousie	1874	11.19				1874	8	0 30
Dalton			1885	7	4.01			
Eastman			1883	24	2.50			
Forsyth	1886	11.84	1883	7	2.50	1885	18	1 00
Fort Gaines	1884	11.40	1884	29	3.05			
Gainesville	1873	10.97	1876	1	2.90	1878	3	1 00
Do.								
Griffin	1884	12.10						
Jesup	1886	11.58	1883	13	3.97			
Do.			1886	15	2.77			
McPherson Barracks			1873	11	2.96	1880	10	1 15
Millen	1886	11.69	1886	21	2.90			
Milledgeville	1886	10.97	1886	30	2.50			
Newnan	1884	10.55						
Quitman			1876	16	3.55			
Do.			1883	13	4.14			
Saint Mary's			1877	12-13	6.20	1876	20	1 00
Do.						1877	10	1 00
Savannah	1876	18.79	1876	14-15	5.12	1871	10	1 00
Do.			1887	30	2.54	1872	16	1 00
Do.						1875	20	1 15
Do.			1877	11-12	4.80	1878	8	0 50
Do.						1880	23	0 43

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.					
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.		
Georgia—Continued.			Inches.								
Savannah			1884	22-23	3.54						
Do.			1887	26-27	6.10						
Thomasville	1884	10.15				1881	8	1 30	1.81		
Waynesborough	1886	10.07	1886	6	3.05						
Do.			1886	21	2.80						
Idaho.											
Lewiston	1884	5.66									
Illinois.											
Augusta			1874	4-5	4.50						
Cairo			1875	4-5	2.54	1879	27	1 31	3.00		
Do.			1876	29-30	2.77	1888	23	1 00	1.02		
Do.			1879	27-28	4.96						
Do.			1883	9-10	2.53						
Carbondale			1876	30	4.33						
Charleston			1888	27	2.64						
Chicago			1877	25-26	2.65	1885	3	1 00	1.00		
Do.			1881	6-7	2.50						
Do.			1885	2-3	3.44						
Do.			1885	1-2	3.34						
Collinsville			1888	16	3.92						
Dubois						1884	20	1 00	1.00		
Elmira			1874	4	2.70						
Do.			1881	7-8	3.31						
Fort Wayne	1877	10.20									
Griggsville						1883	20	1 30	1.50		
Hennepin			1875	12-13	3.20						
Do.			1877	21	2.50						
Louisville	1876	11.40									
Mahomet			1886	27	3.26						
Marengo						1867	22	1 00	1.97		
Mattoon			1888	27	5.85						
Morrison			1881	6-7	3.00						
Do.			1882	24-25	3.48						
Do.			1884	2	2.55						
Palestine			1886	26-27	3.59						
Pana			1888	27	4.00						
Paris			1888	27	2.70						
Peoria			1872	1	3.10						
Do.			1872	6	4.93						
Philo			1888	26-27	3.66						
Rockford			1875	2	2.81						
Rock Island			1880	3-4	3.74						
Sandwich			1875	13-14	3.00						
Do.			1874	8	5.00						
South Evanston			1885	2-3	2.60						
Sycamore	1881	11.40									
Springfield	1882	12.71	1882	2-3	3.79	1887	5	0 37	1.17		
Do.			1883	8-9	3.60	1888	21	1 00	1.40		
Do.			1888	21-22	3.35						
Do.			1888	27	2.70						
Watseka			1888	27	2.54						
Winchester			1888	27	4.00						
Wyanet			1875	13-14	4.00						
Windsor			1888	27	4.00						
Indiana.											
Clinton			1884	24	2.97						
Indianapolis	1875	12.20	1885	4	2.67	1874	25	1 00	1.03		
Do.						1875	1	1 00	1.50		
Do.						1875	2	1 00	1.10		
Do.						1882	14	1 00	1.75		
Do.						1885	4	0 25	1.20		
New Corydon			1881	7	2.55						
Rising Sun			1874	10-11	3.25						
Saint Menards Abbey			1875	20-21	2.70						
Terre Haute			1888	27	3.36						
Vevay						1880	13	1 00	1.85		
Indian Territory.											
Arbuckle, Fort.			1870	26	3.03						
Eufaula			1888	10	3.02						
Reno, Fort	1885	10.33	1885	24	4.00						
Sill, Fort			1876	27	3.50	1870	20	0 30	1.13		
Iowa.											
Afton			1878	29	2.85	1876	24	1 00	1.55		
Albion						1881	12	1 00	1.25		
Algona			1875	10.80							
Do.			1885	13.40							
Amana			1877	25	3.75	1877	25	0 45	1.17		
Ames			1878	1-2	2.97						
Boonsborough			1878	1-2	4.00	1879	24	1 00	2.00		
Do.			1879	13-13	2.50	1883	20	2 00	2.00		
Brookville			1877	12.14	2.50						
Do.			1881	13.17							
Byron Township			1875	13.70							
Do.			1877	12.20							
Clarinda						1888	20	1 00	1.80		
Cresco			1875	23	3.95						
Davenport			1880	4	3.50						
Denison			1878	1-2	3.84						
Denmark	1881	12.36	1881	6	2.84	1879	25	0 30	2.02		
Do.			1882	10	2.87	1881	6	1 00	2.84		
Do.						1888	20	0 55	1.18		
Do.						1888	22	0 50	1.10		
Des Moines			1874	10.85	1874	10	3.05				
Do.			1881	15.79	1878	29	2.73				
Do.			1882	12.16	1879	24	4.80	1879	24	1 00	3.00
Do.			1881		1881	5-6	4.51	1880	24	1 00	1.20
Do.			1881		1881	19-20	5.14	1881	13	0 40	1.50
Do.			1882		1882	10	3.31	1881	19	1 00	1.00
Do.			1882		1882	28	2.75	1881	26	0 30	1.32
Do.			1883		1883	17	2.94	1887	13	1 10	2.00
Dubuque			1876	10-11	2.52	1879	9	1 00	1.75		
Do.			1878	1-2	2.54	1881	28-9	1 00	1.75		

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.		Rainfall equaling or exceeding one inch per hour.				
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Iowa—Continued.									
Dubuque		Inches.	1880		Inches	1885	h. m.		Inches
Fort Madison	1877	11.95	1885	3-4	3.03	1885	19	1 00	2.00
Do.	1881	10.50		12	2.80	1883	20	2 00	2.00
Galveston	1871	11.59							
Glenwood	1875	10.50	1881	27	3.00				
Guttenburg			1874	8	2.50	1883	11	1 00	1.10
Do.			1876	10	3.00	1882	22	1 00	1.90
Do.			1878	1-2	3.79	1885	27	0 30	1.10
Do.			1880	14	3.23				
Hamlin			1882	25	3.00	1882	9	1 10	2.00
Ida Grove						1880	13-4	2 00	2.00
Do.						1883	17	1 00	1.40
Independence			1878	28	2.70				
Do.			1879	9	3.00				
Keokuk			1875	14	2.84				
Do.			1881	19	3.16				
Do.			1882	10	2.71				
Logan	1878	10.61	1878	29-30	6.00				
Maquoketa			1881	6	2.50				
Mount Pleasant	1881	15.64	1888	20	2.50				
Muscatine	1881	10.38							
Nashua			1878	2	3.88	1880	14	6 00	7.50
Do.			1880	14	7.50				
Newton	1882	10.63				1881	26	0 30	1.55
Do.						1882	16	0 30	1.00
Osage			1882	17	2.85	1882	17	2 00	2.85
Rockford	1874	10.20	1874	10	3.80				
Do.	1875	18.70	1875	23	5.50				
Smithland			1881	5	2.60	1879	14	1 00	1.00
Do.			1881	19	2.50	1879	24	1 00	1.30
Do.						1879	25	1 30	1.50
Tabor			1878	30	2.54	1877	18	1 30	2.01
Washington	1882	10.87							
Kansas.									
Arkansas City			1874	14	2.50				
Do.			1876	10-11	2.50				
Atchison			1876	27-28	3.65	1874	19	1 00	1.40
Do.			1876	28	4.50				
Baxter Springs			1876	29	4.50				
Belleville			1876	10	4.00				
Do.			1888	13-14	2.50				
Burlington			1876	13	5.00				
Clay Centre			1883	24	3.05	1882	5	0 30	1.02
Creswell			1877	8	2.50	1880	30	1 30	2.50
Do.			1878	19	2.50				
Do.			1879	27	3.50				
Cunningham			1888	19	4.00	1886	1	1 00	2.72
Dodge City			1886	18-19	2.80	1879	26	1 30	1.91
Do.			1887	15	3.01	1879	29	1 01	1.35
Do.			1888	19	3.24	1887	16	2 40	3.00
Do.						1888	19	0 45	3.24
Globe			1888	21	2.70	1888	26	0 42	1.50
Grenola			1888	26	2.90				
Halstead			1888	19	2.98				
Hays, Fort						1875	26	0 45	1.50
Holton						1876	14	1 30	1.62
Do.						1878	13	1 30	2.00
Do.						1883	1	1 00	1.50
Independence			1874	14	4.00	1881	23	3 00	3.37
Do.			1881	23	3.37	1888	21	1 15	2.15
Do.			1881	25	2.62				
Do.			1888	21-22	3.05				
Larned, Fort			1863	22-23	3.90	1863	6	1 00	1.80
Do.			1864	13-14	3.00	1863	29	1 30	2.00
Do.			1865	14-15	2.50	1865	24	1 00	1.00
Do.			1877	23-24	3.32	1868	17	2 00	2.00
Do.			1878	19	6.00	1878	19	4 00	6.00
Lawrence	1876	12.11	1876	13	4.70				
Do.			1876	15	3.60				
Do.			1879		2.62				
Do.			1883	11	2.92				
Leavenworth	1877	10.00	1877	7-8	3.53	1871	26	0 55	1.00
Do.			1879	9	2.59	1888	24	0 40	1.10
Do.			1879	26-27	3.46	1888	26	1 15	1.50
Do.			1882	19-20	2.55				
Do.			1888	26	2.58				
Leavenworth, Fort	1865	10.68	1865	7	3.33				
Do.	1883	12.16	1877	16	3.00				
Do.			1878	7-8	2.93				
Do.			1879	20-27	3.00				
Lebo			1888	21	3.35				
Manhattan			1877	7-8	3.30	1883	23	1 00	1.40
Do.						1883	24	0 30	1.00
Pence			1888	12	3.05				
Riley, Fort						1860	10	1 15	1.35
Russell			1888	19	3.00				
Topeka	1888		20-21	3.00	1888	18	1 39		1.90
Toronto			1888	21	3.19				
Wallace, Fort	1880		23	3.25	1880	23	2 45		3.25
Yates Centre	1882		14-15	2.54	1888	21	0 40		1.15
Do.	1888		20-21	3.19					
Kentucky.									
Danville			1878	17	5.00				
Louisville	1876	6.52	1878	17	2.81				
Louisiana.									
Alexandria	1884	10.19	1884	28	2.75				
Franklin	1883	10.22							
Mandeville			1888	26	2.50				
New Iberia	1888		14	2.69					
New Orleans	1883	12.05	1883	8-9	2.68	1871	30	1 00	1.10
Do.	1887	11.33	1887	29-30	5.47	1881	6	1 00	1.30

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Louisiana—Continued.			Inches.		Inches				
New Orleans			1888	26	4.44	1888	6	1 00	2.00
Do						1888	26	2 30	4.02
Point Plensant			1878	12-14	16.55				
Port Eads			1888	27	4.00				
Shreveport						1883	6	1 00	1.02
Do						1885	10	1 00	1.75
Maine.									
Eastport	1874	6.82	1887	22	3.08	1887	22	0 55	1.00
Do			1878	23	2.48				
Gardiner						1883	12	0 40	1.21
Portland			1875	9-10	2.52				
Do			1885	28-29	2.61				
Preble, Fort			1875	9-10	2.68				
Surry			1875	10	3.00				
Maryland.									
Baltimore			1880	11	2.66	1881	20	1 10	1.16
Do			1883	27	2.66				
Do			1885	28	4.47				
Cumberland			1886	22	3.18				
Do			1876	17	3.30				
Fallston			1880	14	3.60				
Do	1883	10.21	1881	9	3.85				
Do			1883	26-27	4.22				
Footo, Fort			1877	27-28	2.88				
McHenry, Fort			1883	26-27	3.38				
Do			1885	28	4.08				
Do			1886	22	3.04				
Do			1887	22	2.82				
New Market			1876	17-18	3.30				
Saint John's Church			1881	7	2.50				
Do			1881	9	3.00				
Sam's Creek						1874	29	0 35	1.00
Sandy Springs			1878	19	3.64				
Woodstock College			1881	20	3.00				
Massachusetts.									
Amherst			1888	24	2.54				
Boston			1875	9-10	5.35	1879	29	0 30	2.00
Do			1881	10	4.30				
Fall River			1879	4	2.80	1879	2	1 00	1.02
Independence, Fort			1870	20-21	4.30	1879	29	1 00	2.50
Do			1875	10	5.00				
Do			1879	1	2.50				
New Bedford			1881	10-11	3.57				
Do			1885	28-29	3.38				
Somerset			1875	9-10	5.74				
Do			1884	25-26	2.71				
Springfield Armory	1862	10.04							
Springfield			1878	22	3.79				
Taunton			1884	25-26	3.50				
Michigan.									
Alpena						1880	24	0 30	2.00
Battle Creek	1883	16.24	1883	5	2.75				
Do			1883	25	4.75				
Do			1883	26-27	3.00				
Do			1883	28	3.14				
Brady, Fort			1876	16	3.60				
Do			1879	13-14	2.62				
Cassopolis			1888	26-27	2.79				
Detroit			1873	23-24	2.54	1873	24	0 55	1.85
Do						1887	17	0 45	1.50
Escanaba			1878	19-20	3.04	1874	27	0 35	1.15
Fort Wayne						1877	25	1 00	1.00
Grand Haven			1871	23-24	2.65	1876	17	0 45	1.05
Do						1877	9	0 45	1.11
Do						1880	25	0 55	1.00
Do			1886			1886	1-2	1 00	1.00
Grand Rapids						1884	22	1 20	1.70
Hudson						1886	25	1 15	1.60
Lansing						1885	4	0 40	1.94
Marquette			1878	20-21	5.20	1879	26	1 00	1.00
Marshall	1883	10.66							
Northport	1880	11.01	1882	3-4	3.15	1880	10	1 00	1.62
Do	1882	13.50	1882	14	2.60	1882	18	1 50	2.40
Do			1884	21	2.50				
Ovid			1888		2.51				
Port Huron						1885	17	0 45	1.03
Traverse City						1884	22	1 00	1.96
Minnesota.									
Argyle			1888	9	2.87				
Breckenridge						1876	14	0 40	1.67
Duluth	1874	10.59	1881	17-18	2.54				
Do	1880	10.40							
Glenwood			1888	20	3.50				
Moorhead			1885	14	2.60				
New Ulm	1867	11.65							
Pine River			1888	8	2.56				
Ripley, Fort			1865	23	2.80				
Do			1883	10	2.69				
Do			1877	14	2.40	1874	15	2 00	2.08
Do			1877	23	3.03				
Do			1877	29	4.25				
Do			1884	4	2.54				
Saint Paul	1874	11.67	1873	22-23	4.58	1871	30	1 20	2.20
Do			1874	15	2.80	1873	22	1 40	2.28
Do			1877	29	3.48	1874	15	1 25	1.45
Do						1877	29	1 50	3.21
Saint Vincent			1877	22-23	2.74	1887	16	0 45	1.28
Sylvan Park	1872	21.86							
Do	1873	12.60							
Mississippi.									
Aberdeen	1886	13.50	1884	16	2.68				

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Mississippi—Continued.									
Aberdeen		Inches.	1886	21	5.40				
Brookhaven	1886	11.34	1878	12-13	3.70				
Columbus	1886	10.05							
Corinth			1883	13	3.40				
Do.			1887	21	3.00				
Fayette			1878	13	3.40	1880	30	0 35	1-11
Hernando	1886	11.51							
Holly Springs	1886	11.85							
Jackson						1888	17	0 40	1-15
Lake			1888	12	2.99				
Meridian			1888	27	3.70				
Natchez			1886	16	2.90				
Do.			1887	28	3.95				
Do.			1888	19	2.57				
Pass Christian	1884	12.73	1884	5	3.30				
Do.			1884	28	2.70				
Port Gibson			1886	17	3.55				
Saranac			1883	28	3.44				
University			1887	27	2.70				
Vicksburg						1879	13	0 55	1-30
Missouri.									
Boonville			1879	26	2.80				
Brunswick			1879	26	2.50				
Kansas City						1878	10	0 45	1-56
Lamar						1885	21	0 50	1-31
Do.						1887	10	1 10	2-21
Lebanon			1878	30	2.95				
Lexington			1879	27	3.39				
Miami	1888	10.52							
Saint Louis	1845	10.01	1845	21	2.67	1845	31	3 00	2.67
Do.	1848	17.07	1846	3	3.85	1846	3	3 00	3.85
Do.	1853	10.25	1847	28	2.70	1848	2	4 30	6-17
Do.	1859	11.03	1848	3	6.17	1848	31	1 30	2-58
Do.	1875	10.84	1848	31	2.58	1848	32	2 30	4-37
Do.			1848	33	4.37	1848	37	1 00	3-19
Do.			1853	23	4.43	1853	6	1 00	1.07
Do.			1853	23	2.36	1859	30	3 30	3.63
Do.			1854	20	2.38	1865	12	1 00	2.02
Do.			1859	32	4.20	1873	9	2 00	2.93
Do.			1859	30	3.63	1877	25	1 00	1.10
Do.			1860	2	3.06				
Do.			1873	9	2.98				
Do.			1873	9-10	4.06				
Do.			1875	18	3.10				
Do.			1876	30	2.60				
Do.			1885	19	3.12				
Do.			1886	26	3.89				
Do.			1888	15-16	4.64				
Saint Joseph	1877	12.35	1875	4	3.37				
Do.	1879	11.09	1879	10	4.30				
Springfield						1888	26	0 38	1-03
Montana.									
Assinaboine, Fort	1887	9.33	1887	1-2	2.74				
Do.			1887	15-16	3.71				
Maginnis, Fort			1888	20-21	5.28				
Missoula						1875	13	0 30	1-84
Nebraska.									
Clear Creek	1878	10.35	1875	1	8.75	1875	1	3 30	8.75
Do.			1878	1-2	2.58	1877	20	0 45	1-25
Do.			1879	12	3.01	1878	19	2 00	2.00
Do.						1879	13	0 25	2.00
Do.			1882	25	3.03	1882	23	0 30	1.13
Do.						1882	25	0 35	3.03
Do.						1883	15	1 00	1.64
De Soto			1875	27	2.90	1875	27	2 30	2.90
Do.			1878	28-29	4.59	1885	5	0 45	1-25
Do.			1882	27	2.87	1887	7-8	2 30	2.85
Do.			1887	7-8	2.85				
Emerson	1875	10.50	1874	4-5	4.00				
Do.			1874	13-14	3.20				
Do.			1875	26-27	4.25				
Falls City			1886	26	2.54				
Genoa			1886	11	2.50				
Howard			1878	28-29	4.61				
Do.			1878	30	3.00				
Do.			1879	12	2.60				
Johnson	1883	16.30							
Nebraska City	1883	16.27							
Norfolk			1874	9-10	3.30				
Do.			1877	6	2.70				
North Platte			1883	3-4	2.66	1877	24-5	0 35	1.09
Do.						1879	25	0 45	1.09
Do.						1883	16	0 30	1.25
Do.						1887	21	1 00	1.14
Omaha	1875	10.95	1875	17	5.02	1871	9	0 40	1.39
Do.	1882	12.05	1883	1-2	3.38	1874	14	1 00	1.00
Do.	1883	12.70				1875	17	4 10	5.02
Do.						1877	20	0 30	1.05
Do.						1881	21	1 00	1.00
Do.						1881	24	1 00	1.00
Do.						1883	22	0 55	1.36
Peru	1883	13.72							
Plattsmouth			1874	8-9	5.52	1875	26	1 30	1.50
Do.			1874	13-14	5.60				
Ponca	1880	11.38							
Santee			1875	30	4.10				
Stella	1883	13.26				1883	15	1 15	2.00
Tecumseh			1888	26	2.55				
Table Rock	1883	17.02							
Nevada.									
Pioche	1882	3.23							

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of 1 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
<i>New Hampshire.</i>									
Auburn.....		<i>Inches.</i>			<i>Inches.</i>			<i>A. M.</i>	<i>Inches.</i>
Mount Washington.....	1872	18.46	1878	8	3.00	1880	13	0 45	1.50
Do.....	1874	13.44			2.72				
Do.....	1879	11.84			3.00				
Do.....	1882	11.40			5.35				
Do.....	1883	11.30			5.35				
Do.....	1885	11.34			5.35				
Pleasanton.....			1875	9-10	3.05				
<i>New Jersey.</i>									
Atco.....			1879	4	3.23				
Atlantic City.....			1888	28	2.72	1874	8	0 57	1.21
Imlaystown.....			1888	16	2.68				
Lumbertville.....			1858	11-12	3.57				
Moorestown.....					3.57	1888	23	1 00	1.00
Sandy Hook.....	1881	6.80	1862	3-4	2.92				
Trenton.....			1879	4	2.80	1878	5	1 30	2.00
<i>New Mexico.</i>									
Santa Fe.....	1878	3.18							
Gallinas Spring.....						1888	18	1 00	1.52
<i>New York.</i>									
Albany.....			1875	18	2.66	1883	6	1 00	2.00
Do.....			1883	6	2.95				
Ardena.....			1867	17-18	3.22				
Boyd's Corners.....			1887	22-23	3.00				
Buffalo.....			1885	21-22	3.28				
Columbus, Fort.....			1862	4-5	3.00				
Hamilton, Fort.....			1884	25-26	3.75				
New York City.....			1871	17-18	3.30	1883	30	1 00	1.02
Do.....			1881	9-10	2.75				
Do.....			1884	25-26	3.63				
Do.....			1887	22-23	3.00				
Oneida.....	1874	10.38	1874	2	2.70				
Starkey.....						1875	26	1 30	1.60
Syracuse.....			1876		8.00	1876	3	3 30	8.00
West Point.....			1884	25-26	2.50	1879	12	1 00	1.60
<i>North Carolina.</i>									
Attaway (near Statesville).....			1876	4	2.77	1876	17	0 30	2.00
Cape Lookout.....			1878	18	3.17				
Charlotte.....	1886	11.00	1884	11	2.84	1880	7	1 00	1.00
Do.....			1886	6	2.51				
Do.....			1886	30	3.85				
Franklin.....	1876	11.75							
Greensborough.....			1875	11-12	2.95	1875	30	0 45	1.50
Do.....			1876	17	5.60				
Greenville.....			1878	18-19	3.45				
Hatteras.....			1875	8-9	2.84	1880	15	0 40	2.05
Do.....			1876	5-6	3.28				
Do.....			1877	12	3.94				
Do.....			1880	15	2.95				
Kitty Hawk.....	1877	10.97							
Lumberton.....	1880	10.51	1885	10	3.03				
Do.....	1883	12.50	1885	27	3.20				
Macon, Fort.....	1883	10.89	1883	10	7.39				
Salisbury.....	1883	11.99	1885	25	7.10				
Do.....						1875	22	1 30	1.50
Statesville.....									
Southport.....			1878	7	2.89				
Wilmington.....	1875	11.67	1875	20	4.01	1875	21	1 00	3.00
Do.....	1876	12.44	1876	30	7.03	1876	30	1 35	3.77
Do.....	1883	10.54	1877	11	2.99	1879	25	0 50	1.06
Do.....			1883	2	5.22	1883	2	1 00	1.00
Do.....			1886	30	4.73	1884	26	1 00	1.00
Do.....						1885	15	0 42	1.24
Do.....						1887	26	1 00	1.00
<i>Ohio.</i>									
Bellefontaine.....	1877	10.91	1877	5-6	5.06				
Canal Dover.....	1877	10.65							
Carthage.....	1875	12.90	1877	5-6	3.28				
Cincinnati.....	1877	17.33	1877	20	5.18				
Do.....			1880	14-15	3.12	1877	25	1 10	1.37
Do.....						1880	14	2 00	2.00
Cleveland.....						1881	13	1 07	1.90
Do.....			1884	8-9	3.01				
Do.....			1885	9-10	3.00				
College Hill.....			1885	4-5	2.77				
Do.....	1875	13.00	1876	21	3.00	1875	21	2 00	3.00
Do.....	1880	10.50	1880	14	3.00	1875	15	1 00	1.00
Do.....			1881	7-8	2.50	1880	14	3 00	3.00
Columbus.....						1881	13	1 00	1.50
Do.....						1882	25	0 45	1.43
Jacksonborough.....			1875		3.40				
Mount Auburn.....	1880	13.47	1880	14-15	3.80	1879	10	0 00	1.66
North Lewisburg.....	1877	10.60				1879	27	0 35	1.60
Norwalk.....			1879	28	2.45				
Portsmouth.....	1840	10.66	1837	19	2.90	1851	22	0 15	1.75
Do.....			1840	26	4.60				
Do.....			1868	16-17	2.58				
Sandusky.....	1881	10.99	1881	8-9	3.27	1881	17	0 30	1.90
Toledo.....						1888	13	1 10	0.50
Urbana.....	1877	12.34	1877	16	2.97				
Do.....			1877	20-21	4.89				
Wauseon.....						1881	8	1 30	2.48
West Milton.....			1888	27	2.50				
<i>Oregon.</i>									
Lake View.....	1884	6.53							
<i>Pennsylvania.</i>									
Carlisle.....	1862	10.90	1876	18	2.70	1868	6	0 50	1.40
Do.....	1868	10.50							
Erie.....			1885	21-22	3.61	1886	17	0 15	1.02
Do.....			1887	5-6	3.64				
Fallsington.....	1884		1884	25	3.90				

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of 1 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
<i>Pennsylvania—Continued.</i>									
Germantown		<i>Inches.</i>	1887	23	3.60				
Greensburg						1874	29	1 30	1.50
Haverford			1884	25-26	4.82				
Hulmeville			1884	25-26	4.76				
Meadville			1881	9-10	2.75				
Milton	1881	10.08							
New Castle				9	3.60				
Philadelphia	1883			26	3.48				
			1887	22-23	2.88				
Pittsburg			1881	9-10	2.50				
Do						1882	18	0 40	1.30
Do						1883	18	0 40	1.00
State College						1885	21	0 00	1.25
Wellsborough						1884	10	0 40	1.00
Do			1879	28-29	2.54	1879	10	0 45	1.04
Do			1881	7	3.96	1879	27	0 55	1.14
Do			1881	1	3.42	1880	30	0 50	1.10
Do			1882	3	2.90	1880	25	0 55	1.25
Do			1882	19	2.60	1882	19	0 50	2.60
Do			1884	25	2.60				
<i>Rhode Island.</i>									
Block Island	1881	12.93	1881	3	2.84				
Do			1881	3-4	3.85				
Do			1881	9-10	5.97				
Do			1881	10	2.95				
<i>South Carolina.</i>									
Aiken	1864	10.33							
Do	1867	11.48							
Allendale	1883	11.33	1883	7	4.00				
Do			1886	21	3.01				
Anderson			1887	2	3.60				
Batesburg			1885	10	4.08				
Blackville			1885	24	2.56				
Branchville	1886	10.90							
Charleston	1876	14.96	1876	11-12	6.16	1879	29	0 45	1.15
Do	1877	10.31	1876	12-13	4.69	1880	2	1 00	1.04
Do	1886	10.78	1877	11-12	3.99	1884	11	0 40	1.02
Do			1882	18	4.96	1885	18	1 00	1.95
Do			1886	30	2.95				
Chester	1886	13.52	1886	6	3.50				
Do			1886	9	2.70				
Columbia			1872	15	2.50	1874	12	1 05	1.25
Do			1884	15	2.59				
Do			1885	10	2.70				
Florence			1884	27	2.90				
Do			1885	25	2.69				
Greenville	1886	10.99							
Greenwood	1884	10.51							
Hardesville	1884	12.59	1884	13	3.25	1888	30	1 15	3.42
Do	1885	12.92	1885	9	5.50				
Do			1885	24	2.52				
Do			1886	4	2.78				
Do			1888	30	3.46				
Hilton Head						1864	9	1 00	1.00
Jacksonborough	1886	10.70	1885	25	3.52				
Do			1886	21	3.68				
Kingstree	1886	10.16	1885	10	2.60				
Lawrence	1876	12.11							
Litchfield	1883	10.85				1888	1	0 57	2.05
Saint George's			1883	11	3.22				
Do			1886	21	3.08				
Spartanburg	1886	11.65	1884	25	2.85				
Do			1886	10	2.66				
Stanley	1876	13.20							
Yemassee	1886	14.49	1884	15	3.00				
Do			1886	21	3.05				
Do			1886	25	5.00				
<i>Tennessee.</i>									
Austin			1883	7	3.00				
Bolivar			1886	17	2.75				
Brownsville			1885	12	4.50				
Chattanooga			1884	6-7	3.43				
Dyersburg			1885	13	3.79				
Grand Junction	1886	10.48							
Knoxville									
Do						1871	7	1 00	1.42
Do						1878	8	0 45	1.15
Do						1881	1	0 57	1.03
Memphis	1877	18.16	1871	16-17	3.07	1873	10	1 00	2.05
Do			1873	9-10	2.68	1874	15	1 00	1.00
Do			1877	7-8	8.95	1876	9	1 00	1.00
Do			1877	8-9	9.67	1877	17	1 00	1.00
Do			1884	3-3	3.85	1876	29	0 40	1.00
Do			1886	13-14	3.62	1882	12	1 00	1.00
Do						1888	1	0 15	0.51
Do						1888	18	0 20	0.30
Do						1888	30	0 11	0.60
Nashville			1872	8	2.56	1874	30	0 50	1.38
Do						1886	2-3	1 00	2.01
Do						1888	7	0 11	0.33
Do						1888	23	0 14	0.80
Purdy	1876	13.10	1876	14-15	7.20				
<i>Texas.</i>									
Abilene			1886	6	3.00	1886	6	1 00	2.00
Austin			1872	8-9	4.90	1878	16	2 00	2.50
Do			1876	4	3.70				
Do			1876	12	3.70				
Do			1877	7	2.75				
Do			1886	16	2.50				
Brackettville	1880	13.11							
Brenham			1888	18	3.00	1884	23	1 00	1.40
Brownsville	1887	13.80	1883	27-28	3.07	1884	23	1 00	1.40
Do			1883	30	3.23	1886	3	3 35	4.03

Table showing for the month of June, &c.—Continued.

States and stations.	Rainfall of $\frac{1}{2}$ inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Texas—Continued.									
Brownsville		Inches.			Inches			h. m.	Inches
Do.			1886	3	4.56				
Do.			1887	20	4.42				
Clarksville	1878	12.50	1887	20-21	4.03				
Do.			1877	7	2.50				
Do.			1878	16	2.50				
Cleburne	1884	10.00	1884	19	3.21				
Columbia	1888	10.60	1884	2	6.64	1884	2	5 00	6.64
Comfort			1888	17	7.00				
Concho, Fort	1884	13.50	1879	21	2.50	1887	8	1 30	2.16
Corsicana	1881	14.33				1879	15	1 00	1.20
Dallas	1888	10.16	1883	3	2.63				
Elliott, Fort						1882	12	0 25	1.14
Galveston	1871	11.89	1871	3-4	4.60	1871	4	0 14 $\frac{1}{2}$	3.95
Do.			1871	4	4.22	1886	6	1 10	3.30
Do.			1880	23-24	5.27	1888	17	0 30	2.00
Do.			1882	6-7	3.77				
Do.			1884	3-4	2.54				
Do.			1884	19-20	2.59				
Do.			1885	24	5.52				
Do.			1886	6	3.52				
Do.			1887	12-13	4.33				
Do.			1887	26	2.52				
Do.			1888	17	6.40				
Griffin, Fort			1879	21	10.24				
Houston	1888	10.93	1883	13	4.05				
Do.			1884	4	2.60				
Do.			1887	25	3.07				
Do.			1888	17	2.51				
Do.			1888	18	2.70				
Lampasas						1888	23	0 47	1.11
Longview			1885	24	3.93				
McKavett, Fort			1870	19-20	3.84	1870	19-0	3 30	3.84
Do.			1878	17	2.92	1878	18	2 00	2.00
Do.			1878	27-28	2.71				
McIntosh, Fort			1872	7-8	4.20				
Do.			1873	7-8	3.30				
Do.			1886	11-12	2.84				
Melissa	1876	13.59	1878	28	5.10	1877	7	2 00	2.00
Mesquite						1875	7	1 00	3.38
New Ulm	1888	10.42	1878	17-18	6.50	1888	17-8	5 00	5.03
Do.			1888	10-15					
Palestine			1883	3	3.68	1883	3	0 30	1.66
Ringgold Barracks			1887	3	2.92	1876	5	1 00	1.04
Do.						1887	3	2 00	2.92
Rio Grande City			1887	3	2.74	1887	3	2 20	2.74
Do.			1887	20	3.47				
Do.			1887	20-21	3.27				
San Antonio						1886	27	1 00	1.50
Sour Lake	1888	15.10	1884	3	3.07				
Do.			1886	17	3.00				
Do.			1888	18	9.70				
Terrell	1878	17-12	1878	12	4.50	1878	12	4 10	4.50
Tyler	1888	11.17	1884	3	3.00				
Weatherford	1884	12.16	1884	1	2.50 $\frac{1}{2}$				
Do.			1884	2	4.00 $\frac{1}{2}$				
Do.			1884	3	5.00 $\frac{1}{2}$				
Do.			1888	23	3.00				
Utah.									
Salt Lake City	1885	2.67							
Vermont.									
Burlington			1879	4.52					
Stratford			1875	18-19	2.50				
Do.			1876	14	2.50				
Virginia.									
Dale Enterprise	1884	11.00				1887	20	0 50	1.00
Johnstown						1876	29	1 00	1.78
Keswick			1872			1881	8	1 00	1.00
Do.						1881	3	0 30	2.00
Lynchburg			1874	10	3.46	1873	17	1 30	2.16
Do.			1876	17	2.79	1879	15	0 30	1.03
Monroe, Fort	1873	12.33	1882	16	2.84				
Mount Solon			1878	17-18	2.55				
Norfolk			1883	13-14	2.56	1872	24	1 20	3.10
Do.			1883	13-14	3.77	1873	5	1 03	1.57
Rappahannock			1887	23	2.63				
Do.			1887	27	3.64				
Wytheville			1875	25	2.70	1875	25	0 44	2.70
Washington.									
Neah Bay	1888	10.28							
West Virginia.									
Morgantown	1877	6.70							
White Sulphur Springs						1888	22	0 50	1.19
Wisconsin.									
Beloit			1875	1	2.70				
Embarras	1880	11.40	1884	8	3.10	1880	10	1 00	2.00
La Crosse			1875	23-24	2.51	1874	26	0 50	1.02
Do.			1883			1880	10	0 50	1.00
Do.						1884	21	0 40	1.37
Do.			1888			1885	2	1 48	1.54
Wyoming.									
Cheyenne	1883	3.67				1883	16	0 30	1.00
Do.						1885	27	0 50	1.00

Recent collection of additional data and thorough search of all records of the Signal Service make it possible to publish in this REVIEW a much larger amount of data in connection with the subject of excessive precipitation than it has been

practicable to give in preceding REVIEWS. While the records show that during June in past years monthly rainfalls of ten inches or more have, in general, been more numerous than in May, the large increase in the amount of data given in this issue is due largely, as stated above, to a more detailed examination of records and to the receipt of additional data.

The south Atlantic states and upper Mississippi and Missouri valleys are the districts that have been most subjected to excessive rainfalls in June, but even in these districts there are many of the older established stations at which the maximum June rainfalls have not reached ten inches. On the north Pacific coast, at Neah Bay, Wash., 10.28 inches of rain fell in June, 1888. There is no record of any previous May or June rainfall equalling this amount on the north Pacific coast, and there is but one instance on record in which it has been exceeded in April, viz., 10.78, at Olympia, Wash., in 1878. The largest monthly rainfall in June of which there is record is 28.86, at Fernandina, Fla., in 1864. East of the Mississippi River the states in which the rainfalls of June have not reached ten inches are the following: Maine, Vermont, Delaware, West Virginia, and Kentucky.

Westward of the one hundredth meridian very few daily rainfalls amounting to 2.50 inches, or more, have been recorded, while to the eastward of the meridian named there is no state in which they have not occurred. These excessive daily rainfalls have been most frequent in the upper Mississippi and Missouri valleys and along the Gulf and Atlantic coasts. In

seventeen years at Galveston, Tex., daily rainfalls exceeding the amount mentioned have occurred eleven times. Nineteen instances of such rainfalls in June at Saint Louis, Mo., are on record, but as the observations at that place cover about half a century, it appears that the west Gulf coast is more frequently subjected to excessive daily rainfalls in this month than any other part of the United States. The fall of 10.70 inches at Pensacola, Fla., for the twenty-four hours ending at 3 p. m. on the 29th, 1887, is the maximum daily amount shown by the records of the Signal Service.

Hourly rainfalls of 1.00 inch or more, like the excessive daily rainfalls, have seldom occurred to the west of the one hundredth meridian. The upper Mississippi and Missouri valleys and south Atlantic coast have been most commonly subjected to rainfalls classed under this heading. Probably one of the most remarkable falls of which there is record is that which occurred at Clear Creek, Nebr., on the 25th, 1882, when there was an actual fall of 3.03 inches in thirty-five minutes; rate per hour 5.22. A fall of 3.95 inches in fourteen minutes (rate per hour, 16.80) is reported to have occurred at Galveston, Tex., on the 14th, 1871, but there is doubt as to the accuracy of the time in which this amount is reported to have fallen. Numerous instances of rainfalls of short duration give a rate per hour in excess of the amounts recorded at Clear Creek and Galveston, but in such cases the actual fall has been small in comparison with that recorded in these two instances in which it exceeded 3.00 inches.

WINDS.

The most frequent directions of the wind during June, 1888, are shown by arrows flying with the wind. In the Southern States the prevailing winds were southerly; in the extreme northwest and upper Missouri valley, northerly; along the New England and middle Atlantic coast, mostly from east or southeast; in other districts, variable.

HIGH WINDS (in miles per hour).

The maximum velocity of wind for June, 1888, at Signal Service stations where the movements are registered, are given in the table of miscellaneous meteorological data. Other than the maximum velocities given in this table, the following have been reported: Fort Maginnis, Mont., 60, nw., 4th; 60, nw., 20th; 72, nw., 22d. Fort Canby, Wash., 54, s., 18th.

LOCAL STORMS.

1st. Tennessee.—Memphis: a wind velocity of fifty-four miles per hour was recorded at 9.35 p. m. This storm unroofed numerous buildings and caused damage to boats lying in the river at this place.

2d. Arkansas.—Twelve houses in a village in Washington county are reported to have been destroyed by a severe storm on this date. **North Carolina.**—Milton, Caswell Co.: about 4 a. m. a violent and destructive hail storm passed near this place. Its path was about five hundred yards wide and its length about twenty-five miles. Hail of unusual size fell in large quantities, causing great damage to crops; several buildings were destroyed.

3d. California.—Red Bluff: a severe thunder-storm, accompanied by rain and hail, passed over this place from south to north between 8.20 and 9.15 p. m. The rainfall in twenty-five minutes amounted to 0.51 inch.

5th. North Carolina.—Between 6 and 7 p. m. a storm passed eastward through the central portion of Cumberland county and thence into Sampson county, destroying timber, crops, etc. About the same time a similar storm passed from northwest to southeast through Harnett county.

6th. Maine.—Buckfield, Oxford Co.: considerable damage was done in this vicinity by hail and lightning during the evening. Large hail is also reported to have fallen at Mon-

mouth, Kennebec Co. **Massachusetts.**—Boston: severe thunder-storms occurred in the western part of the state. In Berkshire county large trees were uprooted by the wind; much damage was done by lightning at various points. **Ontario.**—Ottawa: the severe storm which occurred in the afternoon lasted nearly an hour and caused a large amount of damage. The wind reached a velocity of 80 miles per hour and in the surrounding country blew down many buildings, among which were a number of school houses; several persons were injured, some fatally. **Quebec.**—Montreal: a storm of unusual severity occurred in the afternoon; damage estimated at \$100,000 was done in this city and in surrounding parishes. In some sections scarcely a barn was left standing. **Vermont.**—Saint Johnsbury, Caledonia Co.: a severe storm, accompanied by hail, occurred about 5 p. m. Much glass was broken by hail and some damage was done by wind. Burlington, Chittenden Co.: some of the largest hail seen at this place for a number of years fell during the severe thunder-storm of this date. Lunenburg, Essex Co.: a severe storm occurred to the west and south of this place about 4 p. m. Several buildings were unroofed, and the country was deluged by heavy rain. In some sections, for miles in extent, the trees were stripped of the leaves by hail and hundreds of them blown down; in an orchard of two acres but two trees were left standing.

6-7th. New Hampshire.—Littleton, Grafton Co.: the wind and hail storm during the night was unusually severe and caused much damage.

7th. Illinois.—About 3 p. m. a tornado passed in a northeasterly direction near Texas City, Saline Co., causing damage to buildings, orchards, etc. **New York.**—A tornado is reported to have caused considerable damage in the evening at Kingsbury, Washington Co.; a number of dwellings and barns were blown down. **Tennessee.**—Forest Home, Williamson Co.: a very severe hail storm occurred in this vicinity, causing a large amount of damage to wheat which was ready for harvesting. **Texas.**—A "cloud burst," accompanied by hail and high winds, is reported to have occurred in Montague county in the evening. A large area is said to have been submerged, entailing extensive damage.

8th. Dakota.—Fort Totten: an easterly gale, during which

the velocity of the wind reached 60 miles per hour, prevailed from 4.39 to 7.10 a. m.

8-9th. Dakota.—Fort Yates: a destructive storm passed over this place about 2 a. m. It approached very suddenly and was accompanied by heavy rain. Houses, Indian "tepees," fences, etc., were blown down, and several persons killed by lightning. Reports from Buttzville, Ransom Co., state that at about 3 o'clock a severe hail storm passed over that place, causing great damage to the growing grain. **Kentucky.**—Louisville: it is reported that severe hail storms occurred in the surrounding country and that crops were seriously injured.

9-10th. Maryland.—Middletown, Frederick Co.: a destructive storm of wind and hail passed over this section about 3 p. m.; many trees, telegraph poles, etc., were blown down. **Michigan.**—Reports from a number of places in the upper peninsula state that this storm was of unusual severity, and that the very heavy rainfall caused great damage. **New York.**—South Sodus, Wayne Co.: a storm, which appears to have had the characteristics of a tornado, passed through the northern and western portions of this village about 7 p. m. **Virginia.**—Liberty, Bedford Co.: quite a severe hail storm occurred in the afternoon, the hail-stones being the largest observed here in several years. No serious damage resulted.

The following is from the "Toledo Blade":

EAU CLAIRE, WIS., June 11—A tornado swept across the country near this place yesterday from the southeast, tearing up the wooded country, but missing the villages. The tornado passed over Lake Chester with great speed, forming a huge water-spout. Some observers say that the column of water was three hundred feet in height.

12-13th. Wisconsin.—A very destructive hail storm occurred in the vicinity of Arcadia, Trempealeau Co., during the night, breaking thousands of window panes and causing great damage to crops.

13th. Dakota.—Fort Yates: a severe wind storm, accompanied by occasional peals of thunder, occurred during the afternoon; no rain or hail fell at this place, but it is reported that a few miles north of here hail of large size fell. **Ohio.**—Air-Line Junction, Lucas Co.: a violent storm of about fifteen minutes duration occurred in the afternoon, and caused much damage to buildings and other property. **Toledo:** a very severe and destructive thunder-storm passed over this city in the evening, accompanied by heavy rain and high wind from 7.35 to 7.45 p. m., in which time 0.50 inch of rain fell. The wind blew at the rate of fifty miles per hour. In East Toledo a large building was unroofed and a smoke-stack blown down. **Findlay, Hancock Co.:** great damage was done to buildings, oil-derricks, and crops in the surrounding country by the storm in the evening. Severe storms also occurred on this date at Tiffin, Bellaire, and Shelbyville.

13-14th. Dakota.—During the night a destructive storm occurred in Sargent county. Buildings were blown down or otherwise damaged at Forman and Rutland in the county named.

14th. Washington.—Walla Walla: a severe wind storm prevailed between 6.05 and 7 p. m., the wind reaching a velocity of sixty-five miles per hour from the southwest; some buildings were unroofed. **Wisconsin.**—Milwaukee: a severe electrical storm occurred here during the morning. A cable containing about three hundred telephone wires, connecting the eastern and western portions of the city, was burned out, causing suspension of telephonic communication.

15th. Illinois.—Cairo: the storm in the afternoon was of unusual severity, the wind reaching a velocity of forty miles per hour from the northwest. The wheat fields in the northern part of this (Alexander) county sustained serious injury. **New York.**—New York City: a severe storm passed over the city during the evening. Much damage was done on Staten Island, and many boats in the harbor were overturned. **Oregon.**—A "cloudburst" is reported to have occurred in the vicinity of Arlington, Gilliam Co., near the Columbia River, about one hundred miles east of Portland. At Lexington, about thirty miles southeast of Arlington, seven buildings are said to have been wrecked.

16th. New Jersey.—A violent hail storm is reported to have occurred at Princeton, Mercer Co., the hail-stones being of sufficient size to break windows. **Virginia.**—Dale Enterprise, Rockingham Co., ten miles east of this place, the wheat and corn crops were almost entirely destroyed by hail in the afternoon. Hail of considerable size fell at Dale Enterprise at 4.30 p. m.

17th. Texas.—Galveston: heavy rain and high wind prevailed at intervals from 3.30 a. m. until 8 p. m., the highest velocity being fifty-four miles per hour at 12.25 p. m. The rainfall for sixteen hours was 6.40 inches.

18-19th. Wisconsin.—Buildings and crops in the vicinity of Neenah, Winnebago Co., were considerably damaged by a storm during the night.

19th. Kansas.—Dodge City: at 4 p. m. the wind suddenly veered from southeast to north, and the temperature fell 23° in half an hour. Very heavy rain began 4.15 and ended 5 p. m., the total in forty-five minutes being 3.24 inches. The capacity of the city's sewers was insufficient to carry off the great volume of water, and a large amount of damage was done by the flooding of basements and cellars. The wind attained a velocity of forty-eight miles per hour. About two miles northwest of the city a barn and two wind-mills were overturned. Both west and east of here the storm was equally as severe. **Cawker City, Mitchell Co.:** at 5.15 p. m. a tornado passed through the southwest portion of this town, destroying several buildings. **Montana.**—Fort Maginnis: a moderate thunder-storm, moving from southwest to northeast, prevailed from 9.45 a. m. to 12.50 p. m. Six miles southwest of this place the storm was accompanied by hail of large size, which covered the ground to the depth of two inches, and caused much damage to crops and window-glass. The path of the hail storm was about six hundred yards wide. **Wisconsin.**—White Water, Walworth Co.: a severe wind and hail storm passed over the western portion of this town about 3.30 p. m.; the hail-stones were of extraordinary size and fell thickly for a short while.

21st. Illinois.—Springfield: an unusually severe rain storm prevailed from 1.22 to 4.50 p. m., during which time 2.71 inches of water fell, which the sewers were inadequate to carry off. The cellars in some portions of the city were flooded to a depth of several feet. **Indiana.**—Terre Haute: about 4 p. m. a storm caused considerable damage of minor nature in the southern part of this place. **Montana.**—Fort Maginnis: a very violent storm of wind and rain occurred this date, the wind reaching a velocity of eighty-four miles per hour. The total rainfall for the storm, as measured, amounted to 3.18 inches, but on account of the high wind this amount was doubtless much less than the actual fall, which the observer estimated at from eight to ten inches. The wind velocity and rainfall accompanying this storm are without precedent since the establishment of the station. Great damage was done to crops, buildings, etc., in the surrounding country.

23d. New Jersey.—In the afternoon a severe local storm, accompanied by hail, passed over Gloucester City, Camden Co., unroofing several buildings. **Pennsylvania.**—Violent electrical storms, accompanied by very heavy rain, and in some places by hail, occurred both in the morning and afternoon in the vicinity of Pittston, Luzerne Co. A severe storm also occurred at Pottsville, Schuylkill Co., the very heavy fall of rain causing much damage by flooding basements and cellars.

24th. New York.—A tornado occurred in the vicinity of Aurelius Station, Cayuga Co., between 4 and 5 p. m. It pursued a course slightly to the north of east, causing damage to several buildings. **Texas.**—Cisco, Eastland Co.: several houses were blown down by a storm which occurred in the afternoon.

26th. Alabama.—Snow Hill, Wilcox Co.: the corn and cotton crops in the eastern part of this county were much injured by a severe storm. Reports from Troy, Pike Co., and Childersburg, Talladega Co., state that the storm was also destructive at those points.

27th. Georgia.—Severe local storms prevailed in southern

Georgia on this date, causing damage to crops, outbuildings, etc. *Kentucky*.—Reports from Todd and Muhlenburg counties state that a destructive storm, moving northwest to southeast, passed through those counties, blowing down buildings, etc. *Montana*.—Fort Custer: a thunder-storm passed over this place between 5 and 6 p. m. Hail fell from 5.23 to 5.27 p. m., the average size of the hail-stones being one and one-half inches in diameter, although some were much larger. Horses

and cattle exposed to the storm were badly hurt by the hail. More than 1,000 window panes were broken.

28th. North Carolina.—A severe local storm, the most violent part of which lasted less than one minute, occurred about 2.30 p. m. at Laurinburg, Richmond Co.; some buildings were blown down and others unroofed. Powelton, Richmond Co.: during the afternoon several buildings were unroofed or otherwise damaged by a severe storm.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

In the following table are shown the danger-points at the various stations, the highest and lowest depths for June, 1888, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, June, 1888 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	1	24.7	24 to 27	19.0	5.7
<i>Arkansas River:</i>						
Fort Smith, Ark. ...	22.0	11	16.3	8	4.5	11.8
Little Rock, Ark. ...	23.0	14	16.5	10, 11	6.2	10.3
<i>Missouri River:</i>						
Omaha, Nebr.	18.0	30	16.3	8, 11	11.5	4.8
Leavenworth, Kans. ...	20.0	30	17.9	10	14.4	3.5
<i>Mississippi River:</i>						
Saint Paul, Minn. ...	14.5	1	10.8	10, 29, 30	7.6	3.2
La Crosse, Wis.	24.0	1	13.0	13, 14	9.9	3.1
Dubuque, Iowa.	16.0	2, 3	16.4	18, 19, 20	11.9	4.5
Davenport, Iowa.	15.0	4, 5	12.9	21, 22	9.0	3.9
Keokuk, Iowa.	14.0	1	15.2	30	9.1	6.1
Saint Louis, Mo.	32.0	3, 4	29.3	15	23.2	6.1
Cairo, Ill.	40.0	8	32.4	17	24.0	8.4
Memphis, Tenn.	34.0	8	27.0	19	20.4	6.0
Vicksburg, Miss.	41.0	12, 13, 14	34.9	30	28.8	6.1
New Orleans, La.	13.0	13, 14	12.2	30	10.3	1.9
<i>Ohio River:</i>						
Pittsburg, Pa.	22.0	30	7.0	15, 16	2.0	5.0
Cincinnati, Ohio.	50.0	2	19.2	27	6.5	2.7
Louisville, Ky.	25.0	6	8.1	25	4.0	4.1
<i>Cumberland River:</i>						
Nashville, Tenn.	40.0	30	11.9	27	2.1	9.8
<i>Tennessee River:</i>						
Chattanooga, Tenn. ...	33.0	3	9.2	27	2.8	6.4
<i>Monongahela River:</i>						
Pittsburg, Pa.	29.0	30	7.0	15, 16	2.0	5.0
<i>Savannah River:</i>						
Augusta, Ga.	32.0	1	16.9	26, 27, 28	7.0	9.9
<i>Willamette River:</i>						
Portland, Oregon.		18 to 22	18.2	1	11.8	6.4

The Signal Service observer at Nashville, Tenn., reports that the rains from the 25th to 28th caused the Cumberland River to rise sufficiently to permit the resumption of navigation, which had been almost entirely suspended on account of low water.

FLOODS.

Bar Mills, York Co., Me.: the Saco River at this place was at a very high stage on the 3d. A mill at Hollis was washed away during the evening of the 2d.

New Orleans, La.: nearly three inches of rain fell in one hour and forty minutes on the afternoon of the 6th, causing the inundation of several streets. Another heavy rainfall occurred on the 26th, when about 4.50 inches fell. Between 8 and 9 p. m. a large part of the city was submerged.

Vinita, Cherokee Nation, Ind. T.: a "cloud-burst" occurred near here during the morning of the 10th, flooding the country, and washing away several bridges.

Aitken, Aitken Co., Minn.: the heavy rainfall during the night of the 13-14th caused the inundation of a part of this place, compelling many families to leave their homes.

The "Toledo Blade" of the 12th contained the following, which also appeared in numerous other papers.

DULUTH, MINN., June 12.—The recent severe rains have caused the greatest flood ever known in northern Minnesota. Along the branches of streams tributary to the Saint Louis River millions of acres of land are overflowed and loss of life is feared. At the village of Cloquet, thirty miles from here, that portion of the town which is situated on the island is completely engulfed by a raging torrent. Only the tops of houses are visible. Several dwellings

have been carried away, but the inhabitants were warned in time, and no loss of life occurred. The immense saw mills are flooded and abandoned, and in the booms 80,000,000 logs were jammed yesterday morning, and the number reached 200,000,000 last night. All county bridges have been carried away. Fond du Lac, sixteen miles from here, is under water, and several buildings have been carried down stream. From Fond du Lac to beyond Spring Lake the tracks of the Saint Paul and Duluth Railway are under water from two to three feet, and the stream is still rising. Indians and old settlers say the flood has never been equalled.

Titusville, Crawford Co., Pa.: during the night of the 15-16th there was a very heavy fall of rain, which caused Oil Creek to rise seven feet in about an hour. Buildings were moved from their foundations and bridges were swept away. In the surrounding country great damage was done.

Collinsville, Madison Co., Ill.: the heavy rainfall during the night of the 15-16th damaged property in this vicinity to a considerable extent.

Carrollton, Carroll Co., Mo.: the very heavy rainfall during the night of the 15-16th caused Wakenda Creek to overflow about twenty square miles of the adjacent lowlands. Extensive washouts occurred on the railroads in this section. At Chillicothe, Livingston Co., the rainfall was remarkably heavy, and the lower floors of store rooms, etc., were flooded, causing much damage.

Saint Louis, Mo., 16th: from 12.45 a. m. to 11.48 a. m., 4.50 inches of rain fell, this being the heaviest fall recorded here since the establishment of the signal station in November 1870. In several places there were washouts around the sewer vents. That portion of the city in the vicinity of Cass avenue and Twenty-second street was overflowed in the morning, the sewers being inadequate to carry off the rainfall, but no particular damage was done. Reports from Norborne, Carroll Co., Mo., state that much stock was drowned in that vicinity.

Fort Buford, Dak.: the river overflowed in some places in this vicinity on the 23d.

Fort Stanton, N. Mex.: a very heavy rainfall occurred a few miles west of this place on the 18th. A small stream running through Fort Stanton rose to an unusual height in a very short time. Many bridges and fences were washed away and farms and gardens were damaged.

Mobile, Ala.: light rain began at 11.20 p. m. 25th and continued throughout the 26th, falling very heavy at intervals; the total fall for the twenty-four hours ending at 10 p. m. was 4.63 inches. On the morning of the 27th there was another very heavy fall of rain, amounting to more than six inches.

Leavenworth, Kans.: from 12.08 until 4.20 p. m. 26th 2.50 inches of rain fell. The sewers and culverts were unable to carry off the water and nearly all the cellars in the business portions of the city were flooded. Three-Mile creek, which passes through the city, overflowed and did considerable damage to the Fifth street bridge. All railroads leading into the city suffered from washouts, and trains were delayed in consequence.

Tuscola, Douglass Co., Ill.: the very heavy rainfall during the night of the 26-27th flooded the southern part of this town to such an extent as to compel about fifteen families to abandon their dwellings. It is estimated that about 10,000 acres of corn in this county were submerged.

HIGH TIDES.

Galveston, Tex., 17th. Calais, Me., 27th.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras occurred on but few dates in June, and all of the displays observed were either faint or of moderate brilliancy. The aurora of the 3d was the most extensively observed display of the month. It was reported from eastern Montana to New England coast and southward to the fortieth parallel. Although the night was generally clear and favorable for observing this display, it was only reported from widely distant stations.

Auroras were observed during the month as follows: 1st, Saint Paul, Minn.; Quakertown, Pa. 2d, Webster, Dak.; Traverse City, Mich.; Clayton, N. J.; Delavan, Wis. 3d, Bismarck, Dak.; Independence, Iowa; Bar Harbor, Orono, and Portland, Me.; Blue Hill Observatory, Cambridge, Dudley, and Provincetown, Mass.; Moorhead, Minn.; Poplar River, Mont.; Manchester, N. H.; Beverly and Clayton, N. J.; Rose and Setauket, N. Y.; Reading and State College, Pa.; Madison, Wis. 4th, Marquette, Mich.; Deuster, Wis. 5th, Marquette, Mich.; Saint Vincent, Minn. 10th, Egg Harbor City, N. J. 11th, Eastport, Me.; Wytheville, Va. 12th, Wellsborough, Pa. 13th, Des Moines, Iowa. 14th, Saint Vincent, Minn.; Madison, Wis. 30th, New Haven, Conn.; Kent's Hill and Portland, Me.; Manchester, N. H.; Rose, N. Y.

THUNDER-STORMS.

Thunder-storms were most frequent in Kansas, where they were reported on every day during the month. In the Gulf states and over an area extending from the Missouri Valley eastward to the upper Ohio Valley and lower lake region they occurred on from twenty to twenty-three days. Along the middle Atlantic and New England coasts they occurred on from five to twelve days. The periods of greatest frequency were the 14-16th and 21-24th, when they were reported from twenty-seven to thirty-two states or territories. They were least numerous from 3d to 5th, being reported from eight to eleven states or territories on these dates.

Table showing the number of stations in the several states and territories reporting thunder-storms for each day during June, 1888.

State or Territory.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	
Ala.....										1	2	1	3	1	2	2		3	2	4	1	1	2	2	2	1	1	3	2			
Ariz.....																																
Ark.....	2	1				3		3	2	2		4		1	2	2	3	2	1	1	4	3	2	2	2	1	1					
Cal.....	1	2		1																											1	
Colo.....	3	2											1		2	3	2	4	1	1	1	1			1	1	1	1				
Conn.....															1	3	3							1	1	1	1	1	1	3		
Dak.....			5	10		2	8	5	2		5	7	6	5	4	1			4	5				1	2	2	2	1	6	7		
D. C.....										1					1								1	1								
Fla.....	5	3	4	3						2	2	5	5	2	4	3	5	3	3	3	3	3	3	4		4	3	4	3	5		
Ga.....	1	2	4						2		3	2	4	4	2	1	3	3		1	2	1	1	1	1	1	4	1	2	3	1	
Ill.....	2	1		4	8	15	16	12		3	4	4	6	16	8	7	16	20	16	25	3	3	6	4	15	12		2	3	1		
Ind.....					3		3	1	2					3	1	1	5			5	5	5										
Ind. T.....			3				1	1	4	2										3	3	4	5			3						
Iowa.....			6	19		2	3	6	5	2	4	11	14	16	1		12	10	16	22	11	1	2	2	2	5				1		
Kans.....	5	2	3	2	1	1	2	1	3	1	3	8	3	7	2	1	5	3	10	8	7	5	3	7	4	7	1	1	1	1		
Ky.....					1	2		1	2						2	1					1	1	1	1								
La.....		3			4		1	1	2		2	3	4	3	1	1	3	5		1	1	4	4		3		4					
Me.....						6	2								3							5	1					1		2		
Md.....									2						1	3			1	1	2											
Mass.....					10	8				1				2	12			1		2	2	11	5		1					13		
Mich.....	5		1	5				2	14	5		2	27	20	5	2	1	6	6	7	17	5	4	2				1	2			
Minn.....			5	4		5	8	1			11	7					5	5	3					1	1					3	5	
Miss.....	1	1						1					1	1	1		2	1			2	2		1	1	1	1	1	1	1		
Mo.....						2	2	4	1			2		2		2	3	3	1	2	4	2	1	2	1	4						
Mont.....	1	2	1			6	1		4		2				2	1	1	2	2				1	1		2			1	3		
Nebr.....	1	2		2	5	6	1	2			4	7	6	4	1		3	4	8	1					2	9	1	2	3	1		
Nev.....						1																1										
N. H.....						5	3								4		4													5		
N. J.....															4	4	7				3		8	3	4	1						
N. Mex.....						8		1			2			3	11	18	2	2	4											1	2	
N. Y.....		5													3	11	18	2	2	4			5	7	13	16	1	5		2	9	
N. C.....						3	2							1	1	1	1		2		2	1	1	2	3			2	2	2		
Ohio.....	3	1				2	5	1	11	12		12	13	10							3	10	16	12	3	1	3	1				
Oregon.....	4	1	1			1	1	4	1		1	1	1						2			1	1	2				3	1			
Pa.....	8	1				8	1		6	22	1			21	23	13		6			130	15	32	22		2	1	3	1	3		
R. I.....																																
S. C.....	1		1			1	2	2		3	1	3	1	1	2	2		2		1	2	1	1	2	3	3	5	2				
Tenn.....	3					6	3	6	4	11	1	3	7	12	10	5	3	13	8	3	1	7	8	9	4	3	3	6				
Tex.....		3			2	3	7	2		2	5	2	2	3	1	5	5	1	5	1	1	5	9	8	4	1	2	2	1	1		
Utah.....																																
Vt.....					7					4					1	5					4	2	3	5	3		1		1	3		
Va.....		2			1			1	7	1					2	9		1		4	6	2	4	4	1	3	4	5				
Wash.....	1				2	1		6	2					3			1															
W. Va.....														1			1				1	2	1	1								
Wis.....				3				1	5	1			10	11				5	7	7	5			1	1							
Wyo.....	2	1	2	1		2	2			1		1				1	2	1	4					1	1			4	1			
Total No. of states rep'g	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	

MISCELLANEOUS PHENOMENA.

DROUGHT.

Amherst C. H., Amherst Co., Va., 18th: no rain has fallen here during the past sixteen days and drought is beginning to affect the crops.

Catawissa, Columbia Co., Pa.: the drought which caused some injury to crops in this vicinity prior to the 21st was broken by the rain on that date.

Camden, Kershaw Co., S. C.: heavy rains fell on the 1st and 13th, but at the close of the month the weather was very dry and crops were suffering.

Vevay, Switzerland Co., Ind.: quite a severe drought prevailed here prior to the 27th, on which date there was an abundant rain.

Columbus, Ohio: the general rain which fell on the 28th was of great benefit in this section where the drought was becoming serious to all growing crops and pasturage. The hay is reported to be very light in this vicinity, due to the deficiency in rainfall.

Fort Apache, Ariz.: the light rain on the 29th was the first that had fallen here since May 4th. Vegetation has suffered seriously from the protracted drought.

Livingston, Sumter Co., Ala.: the weather was extremely dry during the first three weeks of the month, and much of the early corn was permanently injured.

HALOS.

The dates on which solar halos were observed over the greatest extent of territory during June were the 5th, 9th, 13th, and 19th; they were least numerous from the 1st to 3d, 10th, and 30th; they were observed on ten days in New York, Ohio,

and Washington Territory, California reporting the maximum, eleven days.

But few lunar halos were observed from the 1st to 13th and from the 24th to 30th, there being eight days during these periods on which none were observed; lunar halos were quite numerous from the 16th to 20th; they were seen on from six to eight days in Alabama, Missouri, Pennsylvania, Texas, and Virginia. None were reported from Connecticut, Delaware, District of Columbia, Indian Territory, Maine, Maryland, New Hampshire, New Mexico, Rhode Island, Utah, Vermont, and Wyoming.

The phases of the moon, Washington mean time, during June, as given in "The American Ephemeris and Nautical Almanac," are as follows: new moon, 8th, 23h. 25.8m.; first quarter, 16th, 13h. 41.5m.; 23d, 3h. 59.3m.; last quarter, 30th, 10h. 44.4m.; apogee, 5th, 16.2h.; perigee, 21st, 7.1h.

METEORS.

Prof. J. A. Mitchell, Mount Saint Mary's College, Emmitsburg, Md., furnishes the following:

At 10.45 p. m. Monday evening, June 10th, a meteor of extraordinary brilliancy passed over that portion of the heavens occupied by the constellations Aquila and Ophiuchus. It was first seen to emerge near the star Alpha Aquila, and then finally disappeared behind a cloud near the star Theta Ophiuchi. The size of the disk was about one-fourth the apparent diameter of full moon. At first it presented an elongated appearance, one end of which developed into a tail of about five apparent diameters of full moon. The color of the nucleus was at first of a pale blue, changing very suddenly to a reddish tinge. The duration of its appearance was about five seconds, and its brilliancy was such that the country appeared as if suddenly illuminated with the electric light. I may add that I have not observed a meteor of such superior beauty and brilliancy since the summer of 1885.

The Signal Service observer at Sebastian, Fla., reports:

At 12.30 a. m. of the 23d instant, while returning from a repair trip thirty miles south of station, a beautiful meteor of more than ordinary brilliancy was seen. It appeared to be about one-fourth the size of the moon. Appearing in the western horizon, about forty-five degrees from the zenith, it moved in a northerly direction first parallel with the earth then describing part of an elliptical curve, was dissipated apparently within twenty-five degrees of the horizon on a line running north and south, traversing about ninety degrees of space. The meteor was sufficiently large to cast a shadow upon the cabin of the boat; following it was a train of dazzling light, apparently some twenty feet in length, which lasted six or eight seconds. The color at first was a bright red changing to orange. The smoky cloud which was subsequently formed finally disappeared in a perpendicular direction, or at right angles to the primitive line of the meteor. The night was cloudless, with a very light southerly wind. This meteor was so luminous that it attracted the attention of persons whose backs were turned to it. It was by far the most brilliant of the numerous meteors observed by me on previous occasions.

Meteors were also observed as follows: 1st, 3d and 6th, Duke, Fla. 8th, Auburn, Ala.; Kalamazoo, Mich.; Utica, N. Y., and Clebourne, Tex. 9th, Provincetown, Mass., and Stateburg, S. C. 10th, Washington, D. C.; Baltimore, Md., and McMinnville, Oregon. 12th, Lava, N. Mex. 13th, Beverly

and Clayton, N. J. 15th, Kalamazoo, Mich. 17th, Pittsburg, Pa. 19th, Egg Harbor City, N. J.; Stateburg, S. C. 20th, Utica, N. Y. 22d, Fort McDermit, Nev.; Albany, Oregon. 23d, Cairo, Ill. 25th, Cairo, Ill.; Elk Falls, Kans. 26th, Cleburne, Tex. 27th, Humphrey, N. Y. 29th, Beloxi, Miss.

MIRAGE.

Moorhead, Minn.: a very distinct and well-defined mirage, showing villages, streams, railways, lakes, and distant hills, was observed in nearly all directions, especially in the southeast, during almost the entire day on the 1st. A similar phenomena was also observed in the southeast at 3 p. m. on the 27th. Mirage was also observed at Webster, Dak., on the 1st, 2d, 6th, 10th to 14th, 17th, 25th, 27th, 28th, 30th, and at Traverse City, Mich., on the 2d.

SAND STORMS.

Fresno, Cal., 2d, 3d, 6th, 11th, 16th, 19th, 24th, 26th, 27th. Yuma, Ariz., 3d, 17th. Fort Sully, Dak., 4th. Willcox, Ariz., 6th, 7th, 18th, 28th. Whipple Barracks, Ariz., 17th to 19th. Fort Bowie, Ariz., 18th.

VERIFICATIONS.

INDICATIONS FOR 33 HOURS IN ADVANCE.

The percentages of verifications of the tri-daily indications for June, 1888, as determined from comparison of succeeding telegraphic reports, are given in the table below.

The predictions for all districts east of the Rocky Mountains for June, 1888, were made by Professor Cleveland Abbe, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps; the verifications for all districts were determined by Junior Professor C. F. Marvin.

Percentages of indications verified, June, 1888.

States.		States.	
Maine.....	67.70	Kentucky.....	79.03
New Hampshire.....	63.50	Ohio.....	79.13
Vermont.....	63.93	West Virginia.....	80.87
Massachusetts.....	67.07	Indiana.....	76.27
Rhode Island.....	68.43	Illinois.....	78.57
Connecticut.....	72.00	Lower Michigan.....	74.07
Eastern New York.....	77.33	Upper Michigan.....	68.40
Western New York.....	78.40	Wisconsin.....	72.73
Eastern Pennsylvania.....	77.17	Minnesota.....	75.90
Western Pennsylvania.....	77.40	Iowa.....	74.90
New Jersey.....	79.77	Kansas.....	73.07
Delaware.....	78.57	Nebraska.....	72.03
Maryland.....	74.37	Missouri.....	79.77
District of Columbia.....	72.93	Colorado.....	67.43
Virginia.....	74.37	Eastern Dakota.....	68.20
North Carolina.....	76.87	Southern California*.....	86.16
South Carolina.....	73.43	Northern California*.....	83.27
Georgia.....	73.07	Oregon*.....	81.97
Eastern Florida.....	77.73	Washington Territory*.....	82.33
Western Florida.....	77.90	By elements:	
Alabama.....	78.67	Weather.....	81.25
Mississippi.....	80.87	Wind.....	76.90
Louisiana.....	82.47	Temperature.....	66.51
Texas.....	81.27		
Arkansas.....	80.07	General average.....	74.92
Tennessee.....	76.23		

* In determining the general average percentage for the different elements, the Pacific coast states have not been included.

CAUTIONARY SIGNALS.

Of the total number of cautionary and storm signals ordered during June, 1888, it was practicable to determine the justification or failure of eleven; justified, four, or 36.36 per cent. Of the above, ten were ordered for cautionary signals; number justified, four, or 40.00 per cent. One storm signal was ordered, and was not justified. Total number of direction signals ordered, eleven; justified, ten, or 90.90 per cent. Number of signals ordered for easterly winds, nine; all, or

100 per cent., of which were justified. Number of signals ordered for westerly winds, two; justified, one, or 50.00 per cent. Number of storms without signals, fifteen. Number of signals ordered late, i. e., after the justifying velocity had begun, three, or 27.27 per cent.

LOCAL VERIFICATIONS.

The following extracts from the published reports of the state weather services for June, 1888, show the percentages of verification of weather and temperature signals for the various states:

Michigan.—Weather signals are now displayed in one hundred and forty towns in the state, and upon the baggage-cars of twenty-six trains of eight of the principal railroads of the state.

The indications and cold-wave warnings are issued by the Chief Signal Officer and distributed to the different stations through the central office. The indications are issued at 1 a. m., daily, from the Chief Signal Office, Washington, and are for the twenty-four hours from 7 a. m. to 7 a. m.

The percentage of verification of these indications for June is as follows (the verification is taken from reports of displays furnished this office monthly): temperature, 82.2 per cent; weather, 81.5 per cent.; temperature and weather, 81.9 per cent.

Weather signals are displayed on the baggage cars of the following railroads: C. & G. T. R'y; D., G. H., & M. R'y; D. D. G. T. R'y; M. C., main line and branches; C. & W. M. R'y; G. R. & I. R'y; P. H. & N. W. R'y; and the P. O. & P. A. R'y.

The signals are carried on the first trains leaving terminal points in the morning, and the indications of the weather are for twenty-four hours from 7 a. m. of the day of display.

The signals on the trains are read from front to rear.

When two weather signals are displayed, as the white square followed by blue square, it indicates "fair weather followed by rain or snow."

The black triangle in front of the blue or white square indicates higher temperature. If last in the display it indicates lower temperature. If not displayed, stationary temperature is indicated.

Minnesota.—The verification of weather signals were: 77 per cent. for weather, and 86 per cent. for temperature.

Nebraska.—The percentages of correct weather predictions for the state were: temperature, 93.2; weather, 80.8; mean, 87.0.

Ohio.—The percentage of verification of weather signals received from the Signal Office in Washington, and distributed to forty display stations, was 80 for weather, and 84 for temperature. No cold wave signals were ordered during the month.

South Carolina.—The percentages of verifications of the weather and temperature predictions for the state were: weather, 68.0; temperature, 88.2.

Tennessee.—The percentages of verifications of weather and temperature predictions sent daily from the Signal Office at Washington to the various stations in the state were for the state: weather, 91.8 per cent.; temperature, 90.4 per cent.

STATE WEATHER SERVICES.

The following extracts are republished from reports for June, 1888, of the directors of the various state weather services:

The "Alabama Weather Service," P. H. Mell, jr., of the Agricultural and Mechanical College, Auburn, director:

The month has been remarkable for the continued dry weather through the first half of the period, and the large amount of rain that fell within the last ten days. The farmers generally availed themselves of the dry, sunshiny season to clean out the crops and kill the grass, so that the plants were in a condition to be greatly benefited by the rains falling at the end of the month. The average precipitation was 1.90 inches above the normal.

The temperature was generally cool and pleasant the first half of the month; and at no period was the heat excessive. The average temperature for the state was $2^{\circ}.2$ above the normal.

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.03; maximum observed, 30.49, at Auburn, on the 6th; minimum observed, 29.63, at Chattanooga, on the 27th; range for state, 0.86.

Temperature (in degrees Fahr.).—Monthly mean, 76.6; highest monthly mean, 82, at Troy; lowest monthly mean, 71, at New Market; maximum, 98, at Gadsden, Opelika, and Pine Apple on the 18th, and at Fort Deposit on the 17th; minimum, 48, at Gadsden on the 4th; range for state, 50; greatest local monthly range, 50, at Gadsden; least local monthly range, 19, at Greenville.

Precipitation, including melted snow (in inches).—Average for the state, 6.80; greatest, 13.56, at Mobile; least, 2.05, at Eufaula.

Wind.—Prevailing direction, southwest.

The "Arkansas Weather Service," Prof. John C. Branner, Little Rock, director:

Temperature (in degrees Fahr.).—Monthly mean, 73.6; highest monthly mean, 83.0, at Dallas; lowest monthly mean, 69.4, at El Dorado; maximum, 103, at Lead Hill, on the 16th and 17th; minimum, 48, at Malvern, on the 4th; monthly range for state, 55; greatest local monthly range, 52, at Newport; least local monthly range, 29, at Dayton and Lonoke.

The "Colorado Weather Service," Prof. F. H. Loud, Colorado Springs, director:

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 60.5; highest monthly mean, 76.2, at Cañon City; lowest monthly mean, 35.1, at Pike's Peak; maximum, 102.0, at Pueblo, on 28th; minimum, 18.0, at Pike's Peak and Walden, on the 21st; range for state, 84.0; greatest local monthly range, 64.0, at Home; least local monthly range, 42.0, at Thou; greatest daily range, 53.0, at Home, on the 27th and 28th, and at Monte Vista, on the 7th; least daily range, 4.7, at Red Cliff, on the 19th.

Precipitation, including melted snow (in inches).—Average for state, 0.52; greatest, 2.16, at Springfield; least, 0.12, at Akron, Cañon City, Monte Vista and Pueblo.

Wind.—Prevailing direction, west and southwest.

The "Monthly Review of the Illinois Weather Service," Col. Charles F. Mills, Springfield, director:

The month just passed, while presenting no very abnormal features, was considerably different from a normal one. There were no extremes of temperature. The mean was slightly above the average of similar months in previous years, while the rainfall was very irregular, in some instances excessive, and in others it was far below the average.

The mean temperature of the month was almost the mean of June through the preceding ten years. The mean of the state was $71^{\circ}.3$, only $0^{\circ}.4$ above the average of the past ten years. In the northern division it was $69^{\circ}.1$, or $0^{\circ}.9$ above the average; in the central it was $71^{\circ}.3$, or $0^{\circ}.3$ above, and in the southern it was $73^{\circ}.5$, or $0^{\circ}.1$ below. Thus, the temperature deficiency of the present year has not been increased or diminished in the state during month.

The following heavy rainfalls (in inches) have been reported: Griggsville, 9.77; Winchester, 9.19; Collinsville, 8.97; Pana, 8.74; Mattoon, 8.25; Irish town, 7.59; Jordan's Grove, 7.23; Albion, 7.35; Windsor, 8.09; Golconda, 7.00; Centralia, 6.99; Vandalia, 6.99; Richview, 6.54; Kampville, 6.53; Greedville, 6.52; while at nine other stations it was over five inches, all in the central or southern part of the state. At Riley, however, there was only a fall of 0.81, which was 3.17 below the average of twenty-seven years for that place. At Aurora it was only 0.98, and at several other places in the northern division it was nearly as small. The mean of the northern division was only 2.42; the mean of the central division was 5.75, which was 0.69 above the average, while the mean in the southern division was 6.32, or 1.60 above the average of ten years. Thus, in the whole state, the mean was 4.83, or .09 above the average.

The "Indiana Weather Service," Prof. H. A. Huston, of Purdue University, Lafayette, director:

The temperature during the month of June was slightly above the normal, except in the northern portion, where it was near, or below, the normal. The highest temperatures were noted from the 16th to the 20th, with a reading from 90° to 100° and above. The lowest temperatures were noted from the 1st to the 4th. The changes in the temperature were gradual. Abrupt changes were not noted.

The rainfall was greatly below the normal. No rain of any considerable

amount fell till about the 20th, but from that date until the 29th rain occurred every day. The thunder-storms which passed during these rains were not of a violent nature. Distant lightning in the evening was noted frequently.

The barometric pressure during the month was slightly below the normal. Higher readings were noted from the 3d to the 7th, the 11th to the 12th, and the 29th to the 30th; the highest, nearly everywhere, was noted on the 7th. Lower pressures occurred from the 20th to the 28th; the lowest on the 27th.

The meteorological conditions in general, but especially the rains during the latter part of the month, were quite beneficial to crops and pasturage, and improved their condition very much.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 72.9; highest monthly mean, 76.8, at Columbus; lowest monthly mean, 67.5, at La Grange; maximum, 105.0, at Princeton, on the 18th; the minimum, 37.0, at Fortville, on the 3d and 4th; range for state, 50.2; greatest local monthly range, 61.0, at Fortville; least local monthly range, 37.0, at Seymour and Huntingburg.

Precipitation (in inches).—Average for the state, 3.82; greatest, 8.64, at Mount Vernon; least, 1.37, at Franklin.

Wind.—Prevailing direction, southwest and south.

The "Kansas Weather Service," Prof. J. T. Lovewell, Topeka, director:

The mean temperature for the state is below the average for June in the northeastern counties; this deficiency continues south through the eastern tier of counties to Cherokee, thence westward, but it disappears in Chautauqua. An excess of temperature has prevailed throughout the remainder of the state, being greatest through the middle counties west of Dickinson. The average temperature for the eastern division is $75^{\circ}.1$; for the middle division, $75^{\circ}.2$, and for the western division, $73^{\circ}.6$. The average maximum temperature for the eastern division is $98^{\circ}.0$; for the middle division, $100^{\circ}.3$, and for the western division, $102^{\circ}.1$. The highest day temperature occurred in the western division, and the lowest night temperature in the eastern division.

The average rainfall for the state was 3.96 inches; for the eastern division it was 5.44; for the middle division, 3.04, and for the western division, 2.04. Of the total amount, the western division received 19.4 per cent.; the middle, 28.9, and the eastern, 51.7 per cent. An average rainfall in Jewell, Cloud, Ottawa, Dickinson, and McPherson, thence west to Scott, thence southwest to Morton; while west and north of these counties there was a deficiency, except in Russell and the northwestern portion of Ellsworth, where a slight excess occurs. The deficiency culminates in Grove, Trego, Graham, and Sheridan, where less than an inch fell. A deficiency occurs again in Greenwood, and extends southwest through Crowley and southeast half of Sumner. An excess in Harvey and Sedgwick, thence west to Haskell and Stevens. An excess in the eastern and northeastern counties, which culminates in Shawnee, Douglass, and Jefferson, where it is upwards of three inches above the normal. The drought that prevailed during May in the central and east-central counties has been completely wiped out. Of the heavy rains in twenty-four hours, during the month, many stations report over 2 inches. On the 12th, Scott reported 3.05 inches. On the 19th, at Dodge City, 3.24, at Russell 3, and at Ninnescah 4 inches. On the 20th and 21st, at Topeka, 3; on the 21st, at Toronto, 3.19, and at Lebo, 3.35; and on the 20th and 21st, at Independence, 3.05 inches.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 74.6; highest monthly mean, 79, at Brookville; lowest monthly mean, 70, at Buffalo Park and Collyer; maximum, 110, at Bunker Hill and Montero, on the 17th and 30th; minimum, 36, at Topeka, on the 2d; range for state, 74; greatest local monthly range, 66, at Montero; least local monthly range, 38, at Cawker City and Wilson; greatest daily range, at Tribune, on the 29th; least daily range, 6, on the 8th and 17th, at Pence.

Precipitation, including melted snow (in inches).—Average for the state, 3.96; greatest, 9.14, at Topeka; least, .50, at Collyer.

Wind.—Prevailing direction, south.

The "Louisiana State Weather Service," in charge of R. E. Kerkam, Sergeant, Signal Corps, at New Orleans:

There was a deficiency of $1^{\circ}.3$ in the mean temperature for June, 1888, as compared with the normal of the state for the past eighteen years. The first part of the month was particularly cool, minimum temperatures ranging from 54° in the northern section of the state to 69° in the southern section being reported from the 1st to the 4th.

The weather was generally cloudy and showery throughout the latter part of the month, and although the amount of rainfall for the state was but four-tenths of an inch above the average for June, yet the frequency of the showers had a demoralizing effect on the planting interests of the state.

Summary.

Temperature (in degrees Fahr.).—The average temperature for the state was 78.1, being the lowest June mean on record in the past eighteen years. The highest mean during that period was in 1885, when an average of 82.6 was recorded. In the northern section of the state the deficiency was nearly 1.0 from the normal in that section, exceeding the deficiency in the southern section by 0.5. The difference is due to the cool nights prevailing during the early part of the month in the northern section, there being an average difference of about 3.0 in the minimum temperatures between the northern and southern sections during the first four days of the month.

Precipitation (in inches).—The average for the state for the month was 5.32, which was 0.39 above the normal for June; the average for the northern section was 4.99, and for the southern section 5.64, being respectively nearly one inch above and nearly one half inch below the normal for the section for the month. The heaviest monthly rainfall, 12.69, was reported from the Sugar Experiment Station, and the least, 2.26, from Keachi. The greatest daily rainfall, 4.44, occurred at New Orleans on the 26th.

The "Michigan Weather Service," N. B. Conger, Sergeant, Signal Corps, Lansing, director:

Temperature (in degrees Fahr.).—The mean temperature for June, 67.4, is 1.4 above the normal of thirteen years. The temperature was above the normal in all sections during June. The greatest deviation, 2.9, was for the northern section, and the least was 1.3 above the normal in the southern section. The mean daily temperature was below the normal on thirteen days and above on fourteen days. The highest daily mean temperature, 79, occurred on the 17th, 18th, and 20th, when the temperature was 11 and 12 respectively above the normal, and lowest, 51, occurred on the 2d, when the temperature was 11 below the normal. The highest daily mean temperature for the past thirteen years occurred on the 25th, 1876, 29th, 1878, and 17th, 18th, and 20th, 1888, temperature 79, and the lowest, 47, occurred on the 4th, 1882. The highest monthly mean temperature, 69.5, occurred in 1876, and the lowest, 63.3, occurred in 1885. The maximum temperature, 102, occurred at Omer on the 17th, and the lowest, 27, at Lathrop on the 1st.

Frosts were reported on the 1st, 2d, 3d, 7th, and 11th, in different portions of the state.

The first twelve days of the month were cold, and on the 13th the temperature began to rise, and from the 17th to the 21st the average daily temperature was the highest shown by the records of this service.

Precipitation (in inches).—The average amount of precipitation for June, 2.73, is 1.15 below the normal of thirteen years. The precipitation was below the normal in all sections. The greatest deficiency occurred in the counties of Charlevoix, Benzie, Manistee, Emmet, and Lake, where the deficiency ranged from 3.32 at Charlevoix to 2.26 at Chase. General rains occurred on the 1st, 9th, 10th, 13th, 14th, 21st, 23d, 24th, 25th, 27th, and 28th. The rain of the 13th was the heaviest, thirty stations reporting over one-half inch on that date. The largest monthly rainfall, 5.57, was recorded at Houghton, and the smallest, 0.45, at Charlevoix.

The excess of rainfall since January 1, 1888, in the upper peninsula is rapidly decreasing. There was an excess on June 1st at Marquette of 5.14, and on June 30th it was reduced to 2.85.

Wind.—Prevailing direction, southwest.

The "Minnesota Weather Service," Prof. W. W. Payne, Northfield, director:

In eastern Minnesota the mean temperature for the month was from four to five degrees below the average, while in other portions of the state it was nearly normal, the departures being not more than one degree above or below that point.

The precipitation was not equally distributed. The greatest amount fell in the northern and northwestern portions, and the least in the southern division of the state. There was a great deficiency of rain in the western and southern counties of the state during the month. At Saint Paul it was the driest June, with one exception (June, 1879), since 1870; the deficiency equaled 2.8 inches. There was more than the average rainfall in the eastern counties, and in the northwest it was greatly in excess. At Saint Vincent the normal precipitation for the month of June is 3.71 inches, while the rainfall for the month just ended was 7.37 inches, or an excess of 3.66 inches.

Wind.—Prevailing direction, southeast.

The "Mississippi Weather Service," Prof. R. B. Fulton, of the University of Mississippi, Oxford, director:

Temperature (in degrees Fahr.).—Monthly mean, 78; highest monthly mean, 81, at Columbus, Macon, and Natchez; lowest monthly mean, 75, at Memphis, Corinth, and Hernando; maximum, 102, at Columbus on the 15th; minimum, 48, at Meridian on the 4th; range for state, 54; greatest local monthly range, 51, at Columbus; least local monthly range, 22, at Biloxi; greatest daily range, 40, at Columbus and Okolano on the 4th and 18th; least daily range, 2, on the 10th at Lamar.

Precipitation (in inches).—Average for the state, 4.15; greatest, 13.15, at Mobile; least, 0.22, at Hazlehurst. It was nearer the normal in the central portion of the state, the greatest departure occurring in the extreme northern and southern portions. In the northern counties there was a deficiency, and in the southern counties an excess of rainfall. In Wilkerson county there was an excess of 2.43 inches, and in La Fayette county a deficiency of 2.82 inches.

The "Missouri Weather Service," Prof. Francis E. Nipher, of Washington University, Saint Louis, director:

The average temperature for June was 72°.8. The highest reported was 103° at Protém, and the lowest was 3° at Ironton. The average of maximum temperatures was 92°.8, and the average of minimum temperatures 48°.5, making an average monthly range of 44°.3.

The average precipitation was 6.22 inches, which was 1.25 inches above the

normal for June. The greatest amount reported was 10.52 inches at Miami, and the least 2.87 at Protém.

The month is remarkable for unusually heavy rains in nearly all sections.

The "Nebraska Weather Service," Prof. Goodwin D. Swezey, of Doane College, Crete, director:

The month has been one of extremes of temperature, but averaging a little cooler than usual, and, except in the lower Republican and Blue river valleys, a month of rather less than usual rainfall.

Temperature (in degrees Fahr.).—The normal temperature for June in southeastern Nebraska is 70.6. The mean for the past month is 69.4. The highest temperature reported is 102, at Kimball, which is excessive for June. The lowest is 37, at Hay Springs, which is unusually low. There have been eight days that have reached 85, which is about two days less than usual.

Precipitation (in inches).—There has been great inequality of distribution. From the middle of the state northeastward there has been but an inch or two of rain, reaching a minimum at the northeast. Yankton, Dak., had but 1.03. Along the southern line of the state the rainfall was from 5.00 to 7.00, mostly falling in one heavy rain. Joel Hull, of Minden, reports: "On the night of the 25th and morning of the 26th the rainfall from about ten miles south of this station to the Kansas line, extending from the west side of Phelps County in a southeasterly direction, was excessively heavy, estimated in the counties of Franklin and Webster at 3.00 to 5.00, with high wind and hail, destroying nearly all road and railroad bridges on the smaller streams."

The "Nevada Weather Service," Prof. Charles W. Friend, Carson City, director:

Both pressure and temperature for June were below the normal. The highest temperature reported, 100°, occurred at Golconda, on the 30th, and the lowest, 25°, at Elko, on the 12th. The highest temperature, except at Golconda, as noted above, occurred generally throughout the state from the 23d to 27th; and the lowest in the western part of the state from the 1st to the 7th, in the eastern and central parts from the 12th to 21st.

The weather for June was generally fair to cloudy, cool and windy, with a great deficiency of precipitation. Light showers of rainfall occurred from the 1st to the 7th, and from the 17th to 19th; but the rainfall was generally so light as to be of little benefit. The deficiency of precipitation at Carson City since January 1st, 1888, is 3.83 inches, and since September 1st, 1887, 5.61 inches. In some sections of the state the deficiency is not so great, but everywhere the season has been very unfavorable to both agricultural and grazing interests.

The "New England Meteorological Society," Prof. Wm. H. Niles, of the Institute of Technology, Boston, Massachusetts, president:

Special features.—(1) *Thunder-storms.*—These were most severe and widespread on the 6-7th, 15th, 23d, 24th and 30th, and in all cases were experienced in a region south of the centre of a barometric depression. The storm of the 6-7th entered the northwestern corner of Vermont about 3 p. m. of the 6th, moved southeasterly, covering all of New England, except the southern portion, and reached the eastern boundary of Maine about midnight. It was especially violent in southwestern Maine. The storm of the 15th moved in an easterly direction, covering the whole of the district, and was very violent at about 9 p. m. in eastern Massachusetts. The progress of the storm of the 23d cannot be traced with the data at hand, but there were several developments of it, principally in Maine, New Hampshire, Vermont, and Massachusetts. The storm of the 24th, while reported from all of the states except Maine and Rhode Island, was very violent in central Massachusetts, where the rainfall was excessive, reaching over four inches in the vicinity of Northampton. The storm of the 30th was also in several developments, but prevailed principally in Massachusetts and Rhode Island.

(2) *Temperature.*—The average temperature of the month was in general a little above the normal. On the 23d the mercury reached a height rarely attained in New England, several stations reporting a maximum temperature of 100° Fahrenheit.

(3) *Precipitation.*—The rains were irregularly distributed both as to dates and to quantity, as is to be expected when the rainfall attending the passage of well-developed cyclones is given by showers instead of by general rains. In nearly all cases the rains are to be denominated as local, though it will be noticed that they were usually general over a large region of contiguous territory. The rains were nearly general over New England on the 14th, 15th, and 26th. With few exceptions the total rainfall of the month was small, and the average for thirty-one stations, where records for previous years are accessible for comparison, shows a deficiency of 1.15 inches, or nearly forty per cent. The deficiency was greatest in the southern part of New England, where vegetation begins to show the effects of a drought.

Wind.—Prevailing direction, southwest.

The "New Jersey Weather Service," Prof. George H. Cook, of the Agricultural College, New Brunswick, director:

The mean temperature of the state, as compared with normals determined from past records, of twenty-nine stations, was found to be 1°.1 above the mean. The maximum, 104°, is probably the highest temperature recorded

within the state during the month of June. Temperatures ranging from 94° to 104° were recorded between the 21st and 25th at all stations.

The average rainfall for the month, for the state, 2.59 inches, is 1.02 below the average, as determined from past records of twenty-nine stations. Seven stations report an excess, and twenty-two a deficiency. Two stations, Trenton and Tom's River, report a total exceeding five inches, and five stations report a total of less than two inches.

Temperature (in degrees Fahr.).—Monthly mean, 70.8; highest monthly mean, 75.0, at Bridgeton and Trenton; lowest monthly mean, 66.6, at Atlantic City; maximum, 104.0, at Tenaflly, on 23d; minimum, 38.0, at Bordertown, on the 5th; range for state, 66.0; greatest local monthly range, 64.0, at Tenaflly; least local monthly range, 40.5, at Atlantic City; greatest daily range, 45.0, at Bordertown, on the 5th; least daily range, 1.0, at Paterson, on the 28th.

Precipitation, including melted snow (in inches).—Average for the state, 2.59; greatest, 5.69, at Trenton; least, 1.67, at Bridgeton.

Wind.—Prevailing direction, southwest.

The "North Carolina Weather Service," Dr. Herbert B. Battle, of Raleigh, director:

Temperature (in degrees Fahr.).—Mean, 75.3; highest monthly mean, 78.6, occurred at Salisbury; lowest monthly mean, 73.1, at Hatteras; maximum, 102, on the 22d, at Cheraw, S. C.; minimum, 49.7, on the 4th, at Knoxville, Tenn.; range for state, 52.3; average monthly range, 38.8; highest monthly range, 50.0, occurred at Chapel Hill; lowest monthly range, 24.0, at Hatteras.

Precipitation (in inches).—Average, 3.21; greatest monthly, 5.79, at Norfolk, Va.; least monthly, 0.93, at Salisbury. Average number of rainy days, 8.2.

Wind.—Prevailing direction, southwest.

The "Ohio Meteorological Bureau," Prof. B. F. Thomas, of the Ohio State University, Columbus, president; Charles E. Kilbourne, Secretary:

Temperature (in degrees Fahr.).—Mean of the northern section is 68.4; middle, 71.0; southern, 71.9. These means are 0.4, 1.9, and 0.9 above the means of the sections respectively. The mean for the state, 70.4, is 1.1 above the normal. The maximum, 102, occurred at Pomeroy, on the 18th and 20th; minimum, 34.0, at Paulding, on the 3d, and at Youngstown, on the 4th. Only once before, since the opening of the bureau in 1882, has a temperature of over 100 been reported during the month of June. Wauseon reported hoar frost on the 1st, 3d, and 4th; Sidney, Clarksville, Bangorville, Newcomers-town, and New Alexandria, light frost on the 12th; North Lewisburg, 1st, 3d, and 4th; Quaker City, 3d, 4th, 5th, and 12th; Youngstown, 4th and 12th; Toledo, 1st and 3d; Pomeroy, 3d and 4th, and Westerville, 3d.

Precipitation (in inches).—General rains occurred in all sections on the 9th, 10th, 22d, 23d, 24th, 25th, 27th, and 28th; local rains in the northern section, 1st, 2d, 11th, 20th, 21st, and 29th; middle, 14th and 21st; southern, 2d, 6th, 11th, 15th, and 16th. Thunder-storms were reported from all sections on the 9th, 10th, 14th, 22d, and 23d. The mean rainfall in the northern section, 3.88, is 0.24 above the average; middle, 3.15, 0.49 below; southern, 3.16, 0.71 below for the past six years. The mean for the state, 3.41, is 0.31 below the average, making the deficiency for the year to July 1st, 2.66.

"Oregon Weather Service," report prepared by B. S. Pague, Sergeant, Signal Corps, Roseburg, Oregon:

The marked characteristic of the month was the excessive rainfall in all parts of the state.

Temperature (in degrees Fahr.).—The mean temperature of the state for June was 59.3, which is 1 below the normal. The mean of June is only 1.3 above the mean for May. Along the coast the temperature was above the normal. In the Willamette and Umpqua valleys there were but very slight departures from the normal. In southern and eastern Oregon it was below the normal, the greatest deficiency, 6, being at Ashland. The Dalles reports the highest mean temperature, 67, and Fort Klamath the lowest, 52. In the interior valleys, Portland has the highest mean, 62, and Eola the lowest, 59; these temperatures are the same as those of May. Cresswell and Boise City report 90, their maximum being the highest in the state, and Fort Klamath reports the lowest minimum, 30. The maximum was between 80 and 90 in all sections of the state, except along the coast, where it ranged from 68 to 75. Ashland reports the lowest, 40, in the interior valleys, and the highest occurred on the 8th, 9th, 11th, and 22d; the lowest 20th and 30th. It is a noteworthy fact that the mean temperature of May and June, 1888, varied but little from each other. The maximum for June were lower than those of May, while the minimum were higher, this was undoubtedly due to the excessive moisture prevailing in June, and not in May.

Precipitation (in inches).—The precipitation was most decidedly above the normal, except at Lakeview, where owing to 6.53 of rain falling in June, 1884, the normal June rainfall is increased at that point. March, April, and May were dry months, not enough of rain for the need of crops; but June was in reality a rainy month. Astoria reports 7.23, the greatest amount in the state, and Lakeview 1.53, the least. The greatest departure from the normal was at Roseburg, where the excess amounted to nearly 5; the least, at La Grande, where it amounted to not quite 1.0. Notwithstanding the excessive June rainfall, the seasonal precipitation, from July 1st, 1887, to June 30, 1888, inclusive, is below the normal, ranging from 2 per cent. below at Ashland to

45 per cent. below at Lakeview, except at Walla Walla, where it is 2 per cent. above the seasonal normal.

Wind.—The prevailing winds for June are from the northwest, but this year the prevailing winds were from the southwest.

The "Pennsylvania State Weather Service," report prepared under the direction of the Franklin Institute, Philadelphia, by Sergeant T. F. Townsend, Signal Corps:

Temperature (in degrees Fahr.).—The mean for June, 1888, as deduced from the observations of more than fifty stations, gives 68.6, which is probably 1.0 above the average. The departures from the June normals (fifteen years) at the Signal Service stations show the following: Erie, 0.0; Pittsburg, +1.0; Philadelphia, +1.5. The mean of the daily maximums at fifty stations, 80.7, and the mean of the daily minimums, 56.1, give an average, or mean, of 68.4, which very nearly corresponds with that determined from the tri-daily readings. The highest temperatures prevailed on the 21st, but they were not unusual for the season. The highest June temperatures for the past fifteen years give an average at Erie, Pittsburg, and Philadelphia of 87.7, 94.0, and 92.5, respectively, against 87.5, 95.2, and 97.2 during June, 1888. Lock Haven reports 100; Chambersburg, 99.5; Reading, Catawissa, Carlisle, and Montrose, 99.0. The lowest temperatures noted were Coudersport, 30.0; Somerset, 31.0; Columbus, Dyberry, and Honesdale, 32.0. Most of the low temperatures occurred on the 4th, with frosts at many places. At the close of June the season was less than one week late.

Precipitation (in inches).—There was a rainfall deficiency of about 1.00. The total average throughout the state was 3.04; but, owing to its unequal distribution, several sections had a large deficiency, and a few an excess, caused by heavy local storms. In many parts rain was needed during the first three weeks of the month, but copious showers fell in all districts during the last week, which favorably affected all growing crops. The extremes of rainfall reported were: Coudersport, 6.90; Emporium, 6.57; Girardville, 6.50; Pottstown, 1.55; Bernice, 1.15; Phillipsburg, 1.11; Philadelphia, 1.08.

Wind.—Prevailing direction at 7 a. m., northwest; 2 and 9 p. m., southwest.

The "South Carolina Weather Service," Hon. A. P. Butler, Com'r of Agriculture for South Carolina, Columbia, director:

The mean temperature of the month was 78° 1, two-tenths of a degree higher than for June, 1887, when 77° 9 was recorded. In a great number of instances the maximum temperatures occurred on the 22d and the minimum temperature on the 5th of the month.

The monthly rainfall was 2.73 inches against 3.53 for June, 1887. Copious rains have fallen in some sections of the state, while in others the deficiency has been great. The greatest amount of precipitation occurred at Hardeeville, when a fall of 6.43 inches occurred, of which 3.42 inches fell in one hour and fifteen minutes on the last day of the month. The number of days on which rain fell was 6.8 against 8.1 for June, 1887.

As a whole the month has been favorable for the growing crops. In the early portion of the month the nights were rather cool for cotton, but this was counteracted by the higher temperature of the latter part of the month.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 78.1; highest, 82.0, at Timmonsville; lowest, 74.5, at Cedar Springs; maximum, 102, at Cheraw, on the 22d; minimum, 51.0, at Branchville and Hardeeville, on the 6th; range for the state, 51.0; greatest local monthly range, 45 at Kingstree; least, 14.7, at Charleston; greatest daily range, 35.0, at Brewer's Mine, Cedar Springs, and Kingstree, on 7th, 6th, and 7th, respectively; least, 6.1, at Marion, on 28th.

Precipitation (in inches).—Average for the state, 2.75; greatest, 6.43, at Hardeeville; least, 0.71, at Branchville.

Wind.—Prevailing direction, southwest.

The following is an extract from the report of the "Meteorological Department of the State (Tennessee) Board of Health," prepared under direction of J. D. Plunket, M. D., President of the State Board of Health, by H. C. Bate, Signal Corps, Assistant, Nashville:

The month of June was characterized by frequent local rains, especially during the second and third decades, and the amount of electrical disturbance, also by a cool wave about the 3d and 4th, resulting in a light frost in the western portion of the middle division, and by an abnormally high temperature about the 18th and 19th. The percentage of cloudiness was rather below the normal. Altogether it was a very favorable month for the farmer.

Temperature (in degrees Fahr.).—The mean temperature was 73.4, about the June normal during the past six years. The highest local mean was 78.1, recorded at Maryville, and the lowest 67.6, recorded at Fostoria. The maximum temperature was 100, recorded on the 18th, and was up to the June maximum of last year, the highest during the five years preceding. The minimum temperature was 36, recorded on the 3d and 4th at Hohenwald, and was the lowest June minimum during the past six years, the next being 45, last year. The maximum temperature was recorded at the various stations on the 7th, 16th to 21st, and the minimum on the 3d, 4th, and 5th. The daily ranges of temperature were about the normal.

Precipitation (in inches).—The mean precipitation was 4.23 inches, a little

less than the June mean for the past six years. Of this amount the eastern and western divisions received an average of nearly three and three-fourths inches, and the middle division nearly five inches. Except those of the 27th and 28th, the rains were comparatively light but well distributed, and from the 10th to the 28th, inclusive, they were frequent. The heaviest rains fell on the 10th, 27th, and 28th. The greatest monthly rainfall was 8.00, recorded at Nunnely, and the least, 2.10, at Newport. The greatest amount reported falling in twenty-four consecutive hours was 4.30 on the 26th and 27th, at Fostoria. Other heavy local daily falls were reported, notably, 2.11 at Chattanooga, 2.22 at Beech grove, 2.10 at Fayetteville, 1.83 at Riddleton, and more than two inches at Nunnely, all on the 27th; and 2.19 at Florence Station, 1.72 at Knoxville, 1.60 at Andersonville, and 1.37 at Maryville, all on the 28th. At Maryville on the 28th half an inch fell in the space of ten minutes; at Parksville, on the 15th, 1.0 fell in thirty minutes; and at Nunnely, on the 27th, 2.0 fell in thirty minutes. Rain fell in various portions of the state on twenty-four days, the 3d, 4th, 5th, 6th, 12th, and 30th being reported without measurable precipitation. Hail fell at two stations during the month. Dews were reported at various stations on twenty-four days. Frost was reported at one station, Hohenwald, on the 3d and 4th, but was scarcely perceptible.

The "Monthly Weather Review of the Texas State Weather Service," S. O. Young, M. D., director:

Temperature (in degrees Fahr.).—The average temperature for the state, 80.4; mean of the maximum temperature for the state, 89; mean of minimum temperature, 72. At only seven places in the state was the maximum temperature 100, and above, and this high temperature occurred on the last three days of month. El Paso and Sour Lake reports 104; Tyler, 103; and Brenham, Fort Elliott, Longview, and Weatherford, 100.

Precipitation (in inches).—The average rainfall for Texas for the month, 6.10; the greatest amount of monthly precipitation, 15.10, occurred at Sour Lake; the greatest amount of rainfall in the state during twenty-four hours occurred at Sour Lake on the 18th.

Meteorological record of voluntary observers and Army post surgeons, June, 1888.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Alabama.	°	°	°	In.	British Columbia.	°	°	°	In.
Auburn.....	93	58	76.0	5.30	New Westminster.....	79	45	61.6	5.46
Birmingham.....	91	61	74.0	5.53	California.				
Carrollton.....	90	58	76.0	3.95	Alcatraz Island.....	68	53	60.2	0.17
Edwardsville.....	94	59	79.3	4.40	Angel Island.....	82	54	64.4	0.13
Eufaula.....	94	57	75.4	2.05	Banning.....	98	49	.....	0.00
Florence.....	94	56	72.0	6.49	Barstow.....	.....	.....	.....	0.00
Fort Deposit.....	98	55	79.5	8.33	Benicia Barracks.....	90	56	67.0	0.38
Gadsden.....	98	48	73.0	4.70	Bidwell, Fort.....	87	36	58.3	1.49
Greensborough.....	96	64	78.0	4.14	Gaston, Fort.....	87	37	58.1	4.20
Greenville.....	97	70	80.0	.....	Georgetown.....	90	41	63.3	1.56
Livingston.....	93	59	77.0	6.05	Hydesville.....	76	41	.....	3.92
Marion.....	95	54	80.9	4.94	Lewis Creek.....	104	62	82.0	0.00
Mt. Vernon B'ks.....	96	57	79.3	7.86	Mason, Fort.....	78	57	62.0	0.06
Mount Willing.....	96	54	77.0	8.95	Nicolaus.....	92	56	68.9	0.15
New Market.....	86	50	71.3	7.54	Oakland.....	80	53	63.1	0.46
Opelika.....	98	56	77.7	5.28	Oroville.....	93	37	72.3	1.16
Pine Apple.....	95	50	73.8	.....	Presidio of San F.....	74	47	60.8	0.80
Selma.....	95	53	78.2	3.30	Sacramento.....	96	44	66.8	0.39
Talladega.....	93	49	81.0	7.91	Salinas.....	75	51	62.1	0.00
Troy.....	93	68	82.0	8.09	Santa Barbara.....	82	50	64.4	T.
Tuscaloosa.....	90	49	80.1	3.81	Santa Maria.....	88	34	63.7	0.24
Tuscumbia.....	92	55	74.5	6.09	Willow.....	107	43	71.4	.....
Union Springs.....	92	63	77.0	5.87	Colorado.				0.75
Valley Head.....	92	58	73.0	4.19	Bennett.....	.....	.....	.....	0.96
Arizona.				0.05	Georgetown.....	82	36	57.7	0.02
Holbrook.....	98	40	.....	0.05	Lewis, Fort.....	83	31	59.7	.....
Huachuca, Fort.....	96	55	.....	1.06	Connecticut.				1.40
McDowell, Fort.....	110	54	89.0	0.00	Canton.....	97	42	.....	1.06
Mojave, Fort.....	109	49	84.4	.....	Hartford.....	99	51	71.5	1.06
Teviston.....	.....	.....	.....	0.14	Mansfield.....	94	41	65.3	2.10
Tucson.....	99	.....	.....	0.55	Middletown.....	100	42	67.7	1.86
Winslow.....	.....	.....	.....	0.01	New Hartford.....	99	43	65.6	1.65
Arkansas.				7.10	Shelton.....	96	40	67.2	3.52
Alexander.....	91	60	76.0	7.10	Southington.....	97	53	69.0	1.53
Conway.....	88	55	72.3	5.39	Thompson.....	92	43	65.2	.....
Dallas.....	100	70	83.0	8.10	Voluntown.....	102	47	.....	0.95
Dayton.....	91	63	77.8	9.50	Waterbury.....	96	38	67.4	1.55
Devall's Bluff.....	95	49	75.3	5.17	Dakota.				5.96
El Dorado.....	91	48	69.4	7.09	A. Lincoln, Fort.....	98	34	64.8	2.04
Eureka Springs.....	93	52	73.3	8.78	Davenport.....	97	31	65.6	1.10
Forrest City.....	94	60	76.6	3.22	Garden City.....	97	32	64.8	1.10
Heber.....	94	49	74.4	3.16	Goddard.....	.....	.....	.....	3.30
Helena.....	95	50	77.7	5.70	Farmington.....	90	42	67.8	3.30
Hot Spring.....	.....	55	73.3	9.54	Kimball.....	93	41	61.0	1.77
Lead Hill.....	103	52	77.1	2.97	Meade, Fort.....	96	35	69.3	5.50
Lonoke.....	91	62	76.0	3.00	Pembina, Fort.....	95	30	.....	8.41
Malvern.....	95	48	77.9	7.25	Randall, Fort.....	99	41	.....	2.64
Monticello.....	96	54	78.4	4.12	Richardson.....	97	42	63.3	8.23
Newport.....	102	50	77.3	7.70	Sisseton, Fort.....	95	39	63.9	1.36
Osceola.....	91	52	74.0	4.78	Sully, Fort.....	100	39	68.3	3.61
Osage.....	86	53	71.1	10.36	Totten, Fort.....	.....	30	62.6	7.57
Pine Bluff.....	97	56	78.9	5.76	Webster.....	98	33	66.8	1.99
Portia.....	97	56	77.8	4.75	Woonsocket.....	99	33	68.4	1.99
Prescott.....	91	58	76.8	3.96	Yates, Fort.....	98	34	66.4	7.92
Russellville.....	95	53	77.3	5.51	District of Columbia.				3.61
Stuttgart.....	96	60	78.2	.....	Distributing res'v'r.....	96	55	75.9	3.74
Texarkana.....	96	59	78.6	0.09	Receiving res'v'r.....	98	36	73.9	.....
Washington.....	93	62	77.5	5.61	Washington aqne.....	98	35	78.2	.....

Meteorological record of voluntary observers, &c.—Continued.

Temperature. (Fahrenheit.)					Precip'n.	Temperature. (Fahrenheit.)					Precip'n.						
Stations.				Max.		Min.	Mean.	Stations.				Max.	Min.	Mean.			
Florida.					°	°	°	In.	Indiana—Cont'd.					°	°	°	In.
Altamonte Springs.	94	64	.....	.....	Salem.....	95	54	73.7	3.25						
Alva.....	93	67	76.4	11.36	Sunman.....	94	42	72.8	2.55								
Archer.....	104	55	81.7	1.97	Seymour.....	90	53	74.7	2.75								
Duke.....	93	65	76.2	4.48	Vevay.....	99	43	74.2	1.69								
Fort Meade.....	94	74	84.0	4.08	Worthington.....	93	52	70.9	3.25								
Homeland.....	98	62	81.3	3.75	Indian Territory.												
Limona.....	96	70	83.4	4.25	Gibson, Fort.....	99	50	77.3	3.74								
Manatee.....	94	62	81.8	3.72	Reno, Fort.....	96	50	75.6	0.28								
Merritt's Island.....	94	68	78.2	2.10	Supply, Fort.....	99	55	74.1	0.84								
St. Francis Bar'cks.....	94	63	78.6	4.68	Iowa.												
Tallahassee.....	92	66	79.3	5.28	Ames.....	94	38	69.7	1.74								
Georgia.									Ames.....	96	38	68.4	3.65				
Athens.....	96	57	76.3	1.89	Auburn.....	90	.....	.....	2.60						
Forayth.....	95	66	79.1	2.84	Bancroft.....	94	50	65.7	3.41								
Marietta.....	90	63	75.0	1.72	Cedar Rapids.....	94	54	69.8	2.29								
Milledgeville.....	93	60	.....	2.66	Clarinda.....	90	49	70.8	4.90							
Idaho.									Cresco.....	89	46	67.8	3.07				
Boisé Barracks.....	88	39	65.5	2.81	Cromwell.....	.....	.....	.....	4.55					
Lewiston.....	94	56	.....	2.80	Des Moines.....	88	41	68.5	.....							
Sherman, Fort.....	82	44	.....	3.07	Denmark.....	85	62	74.7	4.96							
Illinois.									Dysart.....	90	34	79.2	1.20				
Albion.....	103	52	73.4	7.35	Elkader.....	98	40	68.6	2.21								
Aledo.....	96	42	.....	4.33	Fairfield.....	90	54	71.9	.....							
Aurora.....	92	38	69.4	0.98	Fayette.....	93	40	68.2	2.43								
Beason.....	96	42	69.2	2.46	Fort Madison.....	93	54	.....	3.17							
Belvedere.....	95	46	69.1	1.90	Glenwood a.....	102	58	73.1	.....							
Benton.....	93	55	73.7	2.76	Glenwood b.....	100	47	73.2	3.81								
Brush Hill.....	98	49	73.6	3.43	Grinnell.....	86	46	72.3	2.45								
Cedarville.....	89	49	67.7	1.93	Hampton.....	92	36	.....	2.14							
Centralia.....	93	50	73.0	6.99	Humboldt.....	88	43	.....	2.83							
Charleston.....	94	44	72.1	6.77	Independence.....	84	51	68.5	2.27								
Collinsville.....	90	45	71.6	8.97	Iowa City.....	80	44	66.2	1.63								
Dwight.....	93	38	70.2	2.19	Logan.....	98	37	70.8	2.09								
Fairfield.....	94	.....	77.5	.....	Maquoketa.....	90	58	79.0	3.50						
Flora.....	98	38	73.0	4.83	Manson.....	96	36	79.1	4.12								
Gibson City.....	92	46	68.3	5.25	Monticello.....	92	37	69.9	3.18								
Greenville.....	90	44	71.8	6.52	Mount Pleasant.....	97	37	72.0	4.24								
Griggsville.....	90	43	70.6	9.77	Mount Vernon.....	96	51	74.5	1.26								
Golconda.....	92	58	73.6	7.00	Osage.....	.....	.....	.....	3.73					
Hennepin.....	93	39	68.9	2.29	Oswego.....	78	37	61.6	3.55								
Irishtown.....	93	52	72.2	7.59	Oskaloosa.....	96	41	73.2	4.30								
Jacksonville.....	89	45	71.5	4.21	Sac City.....	92	48	66.1	2.81								
Joliet.....	98	45	68.7	1.70	Smithland.....	92	.....	.....	2.60						
Jordan's Grove.....	92	43	73.5	7.23	Vinton.....	87	51	67.9	1.74								
Kampville.....	92	52	75.8	6.53	Washington.....	.....	.....	76.7	3.85						
Lacon.....	93	48	71.5	2.26	Kansas.												
Lake Forest.....	91	36	66.6	2.68	Allison.....	99	57	.....	1.06							
Lacaz.....	85	43	70.5	2.72	Bellville.....	93	.....	.....	5.69						
LaMoine.....	89	36	68.7	4.36	Buffalo Park.....	100	50	70.0	.....							
Martinsville.....	94	49	75.2	5.56	Brookville.....	106	50	79.0	3.60								
Maunoutah.....	90	44	74.0	8.70	Bunker Hill.....	110	60	.....	2.83							
Mattoon.....	97	44	73.0	8.25	Carneiro.....	96	56	73.0	3.08								
McLeansborough.....	98	43	73.8	5.83	Cawker City.....	94	56	74.0	2.80								
Mount Morris.....	94	50	71.1	.....	Collyer.....	100	52	70.0	0.50							
New Athens.....	95	56	75.8	5.55	Cunningham.....	98	51	73.1	5.41								
Oneida.....	94	50	74.0	4.41	Dorrance.....	105	64	.....	.....						
Oswego.....	92	48	70.4	4.10	Dwight.....	.....	.....	.....	6.00					
Ottawa.....	93	52	73.6	3.37	Ellis.....	98	38	.....	.....						
Owauka.....	92	46	68.1	1.39	Elk Falls.....	94	45	.....	4.69							
Pana.....	84	40	65.2	8.01	Ellsworth.....	100	46	.....	1.60							
Paris.....	93	44	70.0	4.63	Englewood.....	.....	.....	78.2	1.36						
Pekin.....	97	41	72.5	2.65	Eureka.....	100	.....	.....	3.91						
Peoria.....	94	46	74.4	1.85	Globe.....	93	54	73.5	8.10								
Philo.....	94	40	71.3	5.11	Gorham.....	100	50	.....	3.50							
Pontiac.....	90	38	66.9	3.84	Grainfield.....	102	50	.....	0.70							
Richview.....	89	42	71.9	6.54	Grinnell.....	106	54	.....	.....						
Riley.....	88	39	66.7	0.81	Grenola.....	103	58	76.0	4.30								
Rockford.....	89	40	68.9	1.27	Halstead.....	102	43	78.0	4.87								
Sandwich.....	93	51	72.5	3.76	Hays City.....	100	58	.....	1.53							
South Evanston.....	94	36	.....	1.78	Hays, Fort.....	97	45	75.2	1.50							
Sumer.....	102	50	75.0	2.90	Horton.....	97	62	75.0	4.23								
Sycamore.....	89	44	67.1	1.27	Independence.....	96	50	74.3	6.44								
Vandalia.....	93	46	73.2	6.95	Kanapolis.....	100	72	.....	.....						
Watseka.....	98	38	69.9	4.23	Lawrence.....	94	52	73.1	8.31								
White Hall.....	88	52	74.7	5.41	Lebo.....	101	39	73.9	6.74								
Windefor.....	92	40	71.1	7.09	Leoti.....	103	41	74.0	1.08								
Winchester.....	92	38	73.5	9.19	Manhattan.....	99	50	74.8	6.04								
Winnebago.....	97	32	70.7	1.13	Montanmant.....	100	47	75.0	1.00								
Indiana.									Montero.....	104	50	2.40				
Angola.....	102	45	70.6	5.16	Morse.....	110	44	77.0	.....							
Blue Lick.....	95	51	70.2	3.42	Oakley.....	92	50	70.0	5.00								
Brookville.....	97	46	73.1	2.32	Ottawa.....	101	50	74.0	2.40								
Butlerville.....	101	52	75.7	1.79	Pence.....	105	52	.....	7.91							
Columbus.....	98	51	76.5	1.88	Quinter.....	98	58	.....	3.85							
Connersville.....	95	48	73.2	3.67	Riley, Fort.....	98	43	75.7	4.17								
Crawfordsville.....	92	49	73.3	8.10	Rome.....	98	50	76.0	1.90								
Delphia.....	99	49	74.4	5.26	Russell.....	100	54	77.0	4.00								
Degonia Springs.....	92	47	73.5	3.85	Salina.....	98	50	78.4	3.03								
Farmland.....	96	49	74.4	3.85	Sedan.....	99	58	77.0	1.97								
Forthville.....	86	37	73.3	1.37	Tribune.....	103	47	75.0	9.14								
Franklin.....	95	52	74.0	4.10	Topeka.....	90	36	72.0	4.73								
Huntingburg.....	90	53	74.0	4.10	Toronto.....	92	42	74.0	1.70								
Jeffersonville.....	97	46	75.5	3.40	Victoria.....	102	.....	.....	4.64						
Lafayette.....	97	40	70.8	3.35	Wakefield.....	100	55	76.0	.....							
Lagrange.....	96	40	67.5	4.13	Wakeney.....	100	48	.....	.....						
Logansport.....	96	46	75.2	4.41	Walker.....	104	60	.....	.....						
Marengo.....	96	52	74.3	3.36	Wellington.....	97	48	75.4	4.38								
Marion.....	99	48	71.9	3.45	Winona.....	100	52	.....	.....						
Mauzy.....	99	39	72.2	4.61	Wilson d.....	98	60	.....	4.11							
Mount Vernon.....	94	52	75.7	8.64	Wilson b.....	98	60	.....	3.87							
Muncie.....	100	51	71.3	2.45	Yates Centre.....	92	42	73.9	4.73								
Princeton.....	105	45	76.7	3.50	Kentucky.												
Richmond.....	98	44	72.0	4.04	Bowling Green.....	.....	.....	.....	6.00					
Rockville.....	90	44	76.4	4.75	Carlisle.....	90	42	.....	4.62							

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Kentucky—Cont'd.</i>					<i>Michigan—Cont'd.</i>				
Frankfort.....	101	44	.....	3.05	Big Rapids.....	96	31	69.3	1.55
Millersburg.....	92	45	.....	.....	Birmingham.....	98	35	68.8	4.10
<i>Louisiana.</i>					Brady, Fort.....	87	31	.....	1.93
Abbeville.....	92	69	78.9	6.51	Bronson.....	95	39	68.4	3.58
Alexandria.....	96	63	78.5	7.01	Buchanan.....	88	40	67.8	4.11
Amite.....	97	57	79.7	4.85	Calumet.....	86	35	59.5	5.03
Baton Rouge.....	88	68	79.0	4.23	Cassopolis.....	94	42	70.5	4.64
Breaux Bridge.....	91	65	78.6	2.49	Central Mine.....	94	42	70.5	4.64
Calhoun.....	95	58	77.9	3.17	Charlevoix.....	81	33	59.1	0.45
Cheneyville.....	95	61	74.0	5.13	Chase.....	95	30	67.5	1.51
Coushatta.....	99	63	.....	4.23	Chelsea.....	94	38	68.0	1.95
Farmersville.....	93	59	77.9	5.06	Coldwater.....	95	42	69.7	4.24
Girard.....	.....	.....	.....	8.37	Colon.....	95	46	70.0	3.42
Grand Coteau.....	89	66	76.7	3.32	Concord.....	93	42	68.9	3.09
Keachi.....	96	60	80.0	2.26	Corunna.....	94	33	68.4	3.06
Lafayette.....	93	55	75.2	3.37	Eden.....	95	42	68.1	2.13
Luling.....	92	65	.....	7.19	Evart.....	99	29	71.1	.....
Mandeville.....	94	61	80.3	5.16	Fletcher.....	100	30	69.0	2.21
Maurepas.....	92	61	77.5	3.32	Gaylor.....	94	29	66.3	2.41
Marksville.....	94	60	73.1	2.98	Hanover.....	92	41	69.1	2.72
Minden.....	98	58	79.6	3.65	Harrisville.....	96	29	63.4	0.74
Melville.....	95	60	75.0	3.37	Hart.....	101	30	71.8	0.87
Morgan City.....	92	65	79.2	.....	Hartford.....	97	38	69.4	2.47
Monroe.....	95	59	80.0	4.76	Hastings.....	96	40	66.9	3.54
Natchitoches.....	98	61	79.2	5.26	Hillman.....	99	29	66.9	2.29
New Iberia.....	90	65	78.8	9.27	Houghton.....	.....	.....	61.5	5.57
Port Eads.....	96	70	81.5	4.40	Hudson.....	96	28	69.6	3.29
Ruston.....	97	62	72.8	4.70	Ionia.....	96	39	69.0	2.61
Saint Joseph.....	91	63	79.6	5.32	Kalamazoo.....	91	41	68.8	4.14
Sugar Ex. Station.....	92	65	79.5	12.69	Lathrop.....	96	27	63.5	1.05
Vernon.....	97	54	74.7	7.26	Madison.....	97	40	68.0	3.78
Vidalia.....	96	60	80.7	5.53	Marshall.....	99	41	72.2	4.80
<i>Maine.</i>					Maple Hill.....	94	30	59.6	1.61
Bar Harbor.....	94	42	.....	1.53	May.....	92	45	67.6	1.61
Belfast.....	90	42	61.2	.....	Mio.....	96	32	67.5	1.26
Cornish.....	93	51	65.2	1.61	Motville.....	92	39	69.0	3.76
Gardiner.....	97	44	63.3	2.59	Mount Morris.....	94	37	68.2	3.31
Kent's Hill.....	92	42	64.3	2.22	Omer.....	103	40	70.8	1.54
Lewiston.....	93	44	63.9	3.34	Ovid.....	93	41	68.3	2.51
Mayfield.....	94	43	63.2	2.27	Petersburg.....	95	38	69.7	3.22
Orono.....	94	44	62.8	3.65	Pontiac.....	86	44	69.1	4.98
Petit Manan.....	71	42	52.6	.....	Pulaski.....	96	43	71.7	3.21
<i>Maryland.</i>					Saint Johns.....	93	42	69.2	3.38
Barron Creek Sp'gs.....	101	60	76.0	.....	Saint Louis.....	97	39	69.5	1.54
Cumberland.....	94	44	70.2	3.76	Sand Beach.....	89	32	64.4	1.02
Great Falls.....	98	55	75.4	4.46	State Capitol.....	92	41	68.8	2.07
McDonogh.....	92	54	71.3	2.03	Thornville.....	92	41	68.9	3.81
McHenry, Fort.....	93	53	.....	3.20	Traverse City.....	98	33	66.0	0.66
Summit Hill.....	.....	67.1	.....	.....	West Branch.....	96	31	68.6	1.10
Woodstock.....	96	44	71.5	1.68	Williamstown.....	90	40	68.8	2.60
<i>Massachusetts.</i>					<i>Minnesota.</i>				
Amherst.....	94	38	69.1	5.40	Alexandria.....	88	40	64.6	.....
Amherst b.....	94	38	65.8	5.40	Argyle.....	94	24	64.0	5.24
Beverly Farm.....	90	45	60.8	2.63	Delano.....	90	36	66.4	1.73
Blue Hill Observatory.....	93	47	63.9	1.79	Glenwood.....	95	42	65.5	5.21
Cambridge a.....	92	47	66.9	2.51	Mankato.....	88	42	67.4	1.90
Cambridge b.....	94	47	67.4	3.25	Medford.....	89	34	66.2	3.14
Chestnut Hill.....	96	43	66.3	2.58	Minneapolis.....	92	49	67.4	2.50
Cotuit.....	88	44	64.3	2.01	Morris.....	93	40	66.4	1.60
Deerfield a.....	96	37	65.5	5.42	Pine River.....	98	44	65.4	8.30
Deerfield b.....	97	52	68.2	.....	Red Wing.....	89	38	67.4	3.01
Dudley.....	93	42	66.9	2.31	Rolling Green.....	90	48	68.2	1.87
Fall River.....	.....	65.5	1.62	.....	Snelling, Fort.....	99	39	67.5	2.57
Fitchburg a.....	93	50	66.4	4.36	Spring Valley.....	95	30	.....	4.47
Fitchburg b.....	92	52	65.6	4.04	<i>Mississippi.</i>				
Farmingham.....	96	39	67.4	2.80	Aberdeen.....	95	49	77.0	3.45
Groton a.....	94	43	66.8	2.83	Artonish Plant.....	94	61	80.0	6.66
Lake Cochituate.....	97	34	66.2	1.96	Batesville.....	92	53	76.0	4.37
Lawrence.....	95	44	67.4	2.49	Biloxi.....	86	64	79.0	6.11
Long Plain.....	91	50	.....	1.58	Brookhaven.....	96	55	79.0	2.74
Lowell b.....	94	44	67.3	2.81	Canton.....	99	59	.....	5.89
Ludlow.....	95	34	63.8	3.88	Columbus.....	102	51	81.0	4.08
Lynn.....	92	46	65.2	2.09	Greenville.....	91	58	77.0	3.95
Mansfield.....	95	39	66.0	2.23	Hazlehurst.....	98	55	79.0	0.22
Middleborough.....	94	41	64.7	1.78	Jackson.....	92	60	77.8	3.04
Milton.....	96	46	63.6	1.46	Lake.....	95	51	77.7	3.99
Nahant.....	93	42	63.1	2.68	Logtown.....	88	64	79.0	.....
New Bedford a.....	90	46	63.6	1.46	Macon.....	100	55	81.0	1.65
New Bedford b.....	94	43	65.8	1.00	Meridian.....	98	48	80.0	6.10
Newburyport.....	97	44	65.8	1.59	Natchez.....	97	59	81.0	4.45
Northampton.....	97	46	68.6	6.69	Okalona.....	100	50	79.0	1.40
Plymouth.....	98	50	67.5	0.67	Palo Alto.....	94	54	76.9	4.83
Princeton.....	89	41	63.9	3.39	Pearlington.....	90	66	80.0	.....
Provincetown.....	91	47	65.6	1.60	Port Gibson.....	95	54	79.0	2.56
Rowe.....	89	38	63.6	3.27	University.....	92	54	76.0	3.73
Salem.....	90	52	65.9	.....	Waynesborough.....	97	49	79.0	3.41
Somerset.....	100	48	69.8	1.66	West Point.....	95	52	78.0	1.71
South Hingham.....	101	36	.....	1.45	<i>Missouri.</i>				
Springfield.....	97	46	69.7	5.97	Carthage.....	.....	.....	5.18	.....
Taunton c.....	97	37	65.8	1.61	Conception.....	88	53	69.6	4.70
Taunton b.....	98	42	66.8	1.63	Craig.....	95	57	72.1	8.60
Warwick.....	88	38	62.2	.....	Fayette.....	.....	.....	4.74	.....
Wellesly.....	95	38	66.1	1.06	Fox Creek.....	88	50	72.9	5.60
Westborough.....	98	43	68.9	2.27	Frankford.....	96	36	.....	7.00
Williamstown.....	88	34	68.2	3.90	Glasgow.....	91	44	71.9	4.71
Worcester.....	.....	66.1	2.92	.....	Harrisonville.....	100	51	76.4	5.35
<i>Michigan.</i>					Hermann.....	84	37	65.1	4.40
Adrian.....	98	34	69.4	5.20	Ironton.....	98	47	73.7	8.74
Alma.....	94	35	67.4	1.87	Kansas City.....	92	48	71.0	4.27
Bad Axe.....	95	40	66.7	1.99	Kirksville.....	92	41	72.0	6.35
Battle Creek.....	98	41	70.2	1.32	Louisiana.....	98	50	.....	6.10
Bear Lake.....	92	32	67.7	0.93	Mexico.....	96	48	73.5	10.52
Belle Branch.....	100	47	71.7	3.08	Miami.....	92	53	71.1	3.51
Benzonia.....	94	33	64.6	0.47	Oregon.....	94	54	75.7	4.70
Benton Harbor.....	93	45	66.3	3.49					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Missouri—Cont'd.</i>					<i>New Jersey—Cont'd.</i>				
Princeton.....	94	55	74.6	6.90	Tom's River.....	93	45	69.5	5.10
Savannah.....	.....	.....	4.45	.....	Trenton.....	96	56	75.0	5.69
Saint Charles a.....	.....	.....	6.40	.....	Vineland.....	94	53	69.5	3.92
Saint Charles b.....	92	43	73.6	6.96	<i>New Mexico.</i>	92	48	76.4	1.19
Sedalia.....	96	46	76.2	4.69	Albuquerque.....	.....	.....	.....	T.
Shelbina.....	.....	.....	6.70	.....	Bayard, Fort.....	.....	.....	76.2	0.20
Steelville.....	91	38	.....	4.79	Gallinas Spring.....	93	53	74.1	2.24
Westport.....	93	50	.....	6.98	Las Vegas.....	93	42	67.3	1.68
<i>Montana.</i>					Selden, Fort.....	108	56	83.2	.....
Keogh, Fort.....	100	33	.....	4.29	Union, Fort.....	88	42	65.5	2.58
Missoula, Fort.....	.....	.....	3.38	.....	Wingate, Fort.....	87	40	.....	0.04
Shaw, Fort.....	83	33	59.8	.....	<i>New York.</i>				
Virginia City.....	90	37	57.0	3.30	Ardenia.....	96	54	71.0	1.11
<i>Nebraska.</i>					Auburn.....	89	42	67.1	7.02
Ashland.....	.....	.....	5.20	.....	Boyd's Corners.....	95	56	71.6	2.19
Crete.....	.....	.....	70.3	4.17	Brooklyn a.....	97	51	73.3	1.90
Culbertson.....	100	52	76.7	1.85	Carmel.....	96	40	67.8	2.33
De Soto.....	94	43	70.2	3.38	Columbus, Fort.....	94	51	71.0	1.81
Fairbury.....	96	65	.....	6.91	Cooperstown.....	88	45	68.0	4.32
Falls City.....	100	51	72.4	4.22	Eden.....	94	45	68.0	3.25
Fremont.....	92	44	70.0	3.26	Factoryville.....	91	34	64.2	1.15
Genoa.....	92	45	69.8	4.49	Friendship.....	.....	.....	64.2	3.15
Grand Island.....	94	52	75.3	2.60	Geneva.....	.....	.....	64.6	3.93
Hay Springs.....	99	37	67.0	3.26	Humphrey.....	90	39	65.0	3.57
Kimball.....	102	40	.....	2.54	Ithaca.....	96	40	67.7	2.34
Marquette.....	94	46	77.0	2.41	Lyons.....	92	43	64.7	4.98
Minden.....	.....	.....	70.6	7.75	Madison Barracks.....	88	37	64.7	2.18
Nebraska City.....	.....	.....	70.8	3.79	Niagara, Fort.....	91	43	65.7	.....
Niobrara, Fort.....	103	48	70.8	1.96	Palermo.....	91	36	64.9	2.26
Palmer.....	.....	.....	74.2	2.00	Plattsburg B'ks.....	96	32	64.4	1.88
Ravenna.....	.....	.....	74.2	2.01	Palmyra.....	97	52	70.2	.....
Red Willow.....	.....	.....	2.68	.....	Penn Yan.....	.....	.....	.....	3.16
Sargent.....	.....	.....	69.9	3.02	Rose.....	90	43	65.3	4.38
Sidney, Fort.....	99	40	.....	2.17	Setauket.....	94	47	67.5	1.69
Syracuse.....	92	56	72.4	3.09	Utica.....	98	36	65.0	3.68
Tecumseh.....	95	50	72.3	4.31	West Point.....	96	49	.....	1.04
Weeping Water.....	.....	.....	67.1	4.00	White Plains.....	88	54	70.3	2.32
West Point.....	.....	.....	2.75	.....	<i>North Carolina.</i>				
<i>Nebraska.</i>					Goldsbrough.....	99	50	.....	2.10
Austin.....	88	35	.....	T.	Hot Springs.....	94	47	72.3	.....
Battle Mountain.....	.....	.....	60.0	0.51	Lenoir.....	90	54	.....	1.90
Beowawe.....	.....	.....	70.6	0.59	Lumberton.....	98	51	.....	4.00
Browns.....	.....	.....	71.9	0.08	Marion.....	95	51	.....	4.70
Elko.....	90	25	.....	0.06	Mount Pleasant.....	95	52	74.0	3.81
Ely.....	98	29	.....	0.16	Monroe.....	94	50	77.3	1.38
Eureka.....	95	38	.....	0.28	New Berne.....	98	54	.....	3.15
Genoa.....	85	37	.....	0.06	Salisbury.....	95	62	78.6	0.93
Golconda.....	.....	.....	72.0	0.45	Statesville.....	93	58	74.8	2.62
Hot Springs.....	.....	.....	66.3	0.00	Tarborough.....	97	52	75.8	5.17
Humboldt.....	.....	.....	57.8	0.00	Weldon.....	96	50	75.4	5.38
Lovelocks.....	.....	.....	71.6	T.	Wadesborough.....	97	52	.....	1.30
McDermitt, Fort.....	86	34	61.7	0.75	<i>Ohio.</i>				
Mill City.....	.....	.....	68.6	0.42	Akron.....	93	40	68.5	3.09
Pioche.....	94	36	.....	T.	Athens.....	94	44	71.3	3.04
Pyramid Agency.....	92	37	.....	0.11	Bangorville.....	96	38	67.7	4.51
Stillwater.....	85	37	60.0	0.00	Bellevue.....	94	50	.....	4.05
Verdi.....	97	40	.....	0.00	Canton.....	93	38	68.9	2.26
Wadsworth.....	.....	.....	60.1	0.38	Celina.....	94	41	71.4	4.75
Wellington.....	83	29	67.3	0.00	Clarksville.....	94	43	70.0	5.44
<i>New Hampshire.</i>					Cleveland.....	91	42	68.1	5.15
Antrim.....	97	.....	.....	2.80	College Hills.....	86	52	75.7	3.30
Ashland.....	.....	.....	.....	2.34	Collinwood.....	87	40	66.6	4.83
Belmont.....	.....	.....	.....	1.83	Dayton.....	100	42	74.3	1.92
Berlin Falls.....	94	27	60.6	.....	Elyria.....	92	39	79.7	3.95
Berlin Mills.....	93	30	62.8	1.51	Garrettsville.....	93	32	64.8	3.80
Bristol.....	.....	.....	.....	2.06	Gettysburg.....	101	44	73.2	4.50
Concord.....	94	42	66.0	2.57	Greenville.....	92	42	70.7	3.79
Hanover.....	92	38	64.7	4.65	Hanging Rock.....	98	42	69.4	2.88
Lake Village.....	.....	.....	.....	2.38	Hiram.....	91	38	67.1	5.41
Nashua.....	98	39	66.3	1.67	Jacksonborough.....	94	50	72.7	3.40
North Conway.....	97	35	64.3	2.90	Jefferson.....	91	39	65.1	3.95
Plymouth.....	96	34	64.6	3.17	Logan.....	100	41	70.7	3.95
Stratford.....	99	34	66.4	2.93	Lordstown.....	99	34	67.5	2.54
Walpole.....	91	38	63.0	5.43	Marietta.....	95	42	71.9	2.24
West Milan.....	91	31	62.2	1.80	McConnelsville.....	96	39	69.2	2.86
Wier's Bridge.....	.....	.....	.....	2.07	Napoleon.....	96	41	70.3	4.22
Wolfeborough.....	.....	.....	.....	2.46	New Alexandria.....	97	41	70.2	1.97
<i>New Jersey.</i>					New Athens.....	92	42	.....	.....
Beverly.....	99	48	71.1	3.08	New Comerstown.....	96	38	70.1	2.57
Billingsport L. H.....	94	56	73.8	.....	New Lewistown.....	98	42	69.6	2.45
Bordentown.....	97	38	67.2	3.01	Oberlin.....	92	39	67.9	3.64
Bridgeton.....	95	56	75.0	1.67	O. S. University.....	98	38	71.1	2.43
Clayton.....	98	49	70.3	1.76	Paulding.....	97	34	70.0	6.87
Egg Harbor City.....	96	45	67.3	2.04	Pomeroy.....	102	40	76.1	2.51
Gillette.....	99	40	69.7	2.07	Portsmouth.....	95	44	71.6	4.27
Hanover.....	96	39	68.0	4.73	Quaker City.....	94	37	70.9	4.11
Highland Park.....	96	45	69.9	3.78	Ruggles.....	92	42	65.5	.....
Hopewell.....	94	.....	.....	2.15	Sidney.....	101	42	75.4	4.82
Imlaystown.....	94	46	69.8	3.77	Tiffin.....	94	51	71.2	3.51
Locktown.....	94	43	67.7	2.47	Upper Sandusky.....	94	41	70.1	2.98
Lambertville.....	96	54	70.2	2.09	Washington.....	100	40	71.3	4.00
Moorestown.....	94	48	70.3	2.67	Wauseon.....	98	35	69.3	3.52
New Brunswick a.....	93	52	.....	3.51	Westerville.....	98	40	69.4	1.59
New Brunswick b.....	95	46	70.2	3.43	West Milton.....	99	50	71.0	4.50
Newark.....	96	52	72.9	2.70	Wooster.....	88	40	.....	2.31
Ocean City.....	93	55	69.4	2.10	Yellow Springs.....	95	39	70.7	1.74
Oceanic.....	99	52	72.4	3.95	Youngstown.....	94	34	68.9	2.82
Paterson.....	96	42	70.2	3.73	<i>Oregon.</i>				
Princeton.....	95	50	70.9	2.91	Albany.....	83	51	61.0	5.31
Rancocas.....	98	51	67.0	2.36	Bandon.....	71	49	59.3	5.48
Readington.....	102	56	72.0	.....	East Portland.....	84	52	.....	6.10
Somerville.....	96	44	70.9	3.30	Eola.....	75	53	59.2	5.06
South Orange.....	96	43	69.1	4.03	Klamath, Fort.....	84	39	52.9	2.16
Tenafly.....	104	40	69.8	1.89	La Grande.....	81	43	.....	.....

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Oregon—Cont'd.</i>					<i>Pennsylvania—Con.</i>				
McMinnville.....	82	42	59.0	6.37	Smithport.....	92	34	64.2	5.02
Yaquina Lt. House.	68	47	57.0	6.82	Somerset.....	92	31	63.0	2.76
<i>Pennsylvania.</i>					State College.....	95	35	68.8	2.61
Altoona.....	97	41	71.4	2.38	Stroudsburg.....	94	36	68.8	3.11
Bethlehem.....	95	43	71.0	3.12	Swarthmore Col....	96	45	70.3	1.32
Berlitz *.....	91	37	63.9	1.15	Tionesta.....	93	35	64.2	.....
Blooming Grove.....	98	48	69.4	3.50	Troy.....	93	40	66.4	.....
Carlisle.....	99	52	71.3	3.25	Uniontown.....	90	35	72.3	4.65
Catawissa.....	99	40	75.3	3.78	Wellsborough.....	94	35	65.5	3.90
Charlesville.....	94	34	67.1	3.00	West Chester.....	94	49	70.6	1.79
Chambersburg.....	100	41	64.8	2.37	Westtown.....	97	45	69.7	2.23
Clarion.....	90	34	65.4	.....	Wysox.....	94	36	67.6	2.75
Coatsville.....	97	43	69.5	1.76	York.....	98	43	70.8	2.23
Columbus.....	98	32	65.4	4.38	<i>Rhode Island.</i>				
Corry *.....	98	32	65.4	4.38	Bristol.....	86	48	65.6	1.32
Coudersport.....	94	30	64.6	6.90	Newport.....	80	49	64.2	.....
Drifton.....	97	38	65.8	4.18	Olneyville.....	101	46	69.8	.....
Dyberry.....	91	32	63.0	2.07	Providence.....	98	43	68.2	0.95
Eagle's Mere.....	85	39	66.6	2.69	Woonsocket.....	99	46	68.2	2.04
East Brook.....	93	40	.....	.....	<i>South Carolina.</i>				
Easton.....	.....	.....	.....	1.49	Allendale.....	95	56	76.7	2.95
Emporium.....	96	35	72.0	6.57	Batesburg.....	100	58	79.6	3.47
Franklin *.....	90	43	65.7	6.02	Blacks.....	96	52	76.7	.....
Germantown.....	.....	.....	.....	1.55	Blackville.....	97	55	79.8	3.82
Girardville.....	92	30	69.2	6.50	Branchville.....	97	51	79.6	0.71
Grampan Hills.....	94	38	67.3	3.30	Brewer Mines.....	99	54	76.9	1.81
Greenville.....	94	35	65.6	3.44	Cedar Springs.....	97	53	73.3	3.40
Hamilton.....	86	47	65.5	2.84	Cheraw.....	102	53	.....	4.53
Hollidaysburgh.....	98	35	79.7	3.31	Chester.....	95	55	78.8	.....
Huntingdon.....	99	32	63.7	2.39	Clinton.....	101	63	81.9	.....
Indiana.....	99	36	68.1	2.85	Conway.....	93	63	76.3	1.53
Johnstown.....	94	35	67.6	4.60	Evergreen.....	94	54	76.4	2.62
Kutztown.....	96	38	67.7	3.73	Florence.....	99	56	79.9	1.12
Lancaster.....	94	52	69.8	4.25	Graham's Turnout..	94	68	77.2	3.26
Lebanon.....	97	41	70.5	2.56	Georges.....	99	52	78.9	2.71
Lock Haven.....	96	40	69.3	2.57	Greenwood.....	98	59	78.8	1.62
Meadville.....	100	41	69.8	2.00	Hardeeville.....	98	51	80.0	6.43
McConnellsburg.....	90	53	75.6†	.....	Jacksonborough.....	96	52	78.2	5.58
Montrose.....	97	40	69.0	3.10	Kirkwood.....	96	61	75.2	2.80
New Bloomfield.....	99	45	70.6	1.16	Newberry.....	93	55	78.3	3.21
New Castle.....	98	38	66.5	3.50	Orangeburg.....	96	65	79.8	4.00
Phillipsburg.....	95	33	70.5	3.25	Saint Matthews.....	97	56	79.8	2.21
Pottstown.....	95	35	64.8	1.11	Spartanburg.....	97	65	79.8	4.00
Quakertown.....	98	50	73.2	1.85	Stateburg.....	94	46	70.5	2.34
Reading.....	97	42	68.4	3.33	Timmoneville.....	93	65	82.0	2.35
Rochester.....	99	52	72.3	3.33	Trial.....	87	61	75.0	3.28
Seranton.....	94	37	66.7	3.51	Winnabow.....	95	35	70.0	4.00
	96	38	69.1	2.75	Yorkville.....	95	59	78.0	1.67

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Tennessee.</i>					<i>Vermont.—Cont'd.</i>				
Andersonville	95	47	72.5	3.68	Lunenburg	88	35	65.1	2.69
Ashwood	91	47	74.3	3.79	Manchester	90	47	66.6	6.18
Austin	98	46	76.0	4.16	Middlebury	89	50		4.20
Beech Grove	90	61	73.7	5.86	Newport	90	50	68.0	3.00
Covington	88	56	73.5	2.75	Saint Johnsbury	86	30		5.03
Fayetteville	95	54	74.6	3.12	Stratford *	90	52	68.3	2.50
Florence Station	93	57	75.1	5.26	Vernon	98	48	67.6	2.37
Fostoria	90	47	67.6	6.80	<i>Virginia.</i>				
Greenville	91	54	71.1	2.25	Birdsneat *	94	56	73.5	4.15
Hohenwald	93	36	74.0	3.90	Christiansburg	94	46		3.01
Kingston Springs	93	42	73.4	2.51	Dale Enterprise *	97	44	74.3	4.98
Lawrenceburg	97	39	72.0	3.28	Marion	90	40	70.0	3.07
Lewisburg	90	54	75.7	4.52	Monroe, Fort	94	57		7.11
Maryville	93	56	76.1	3.05	Petersburg	93	51	82.6†	3.12
Milan	92	47	73.6	4.17	Summit*	98	44	71.0	.....
Newport	96	54	76.9	2.10	University of Va.	81	60	70.6	3.86
Nunnally	92	43	76.6	8.00	Variety Mills	98	43	72.0	3.03
Parksville	91	50	73.3	3.96	Wytheville	88	42	71.2	1.30
Ridgely	94	45	73.0	7.74	<i>Washington Territory</i>				
Rogersville	95	48	70.0	3.39	Blakely	78	43	61.5	4.15
Savannah	86	48	68.4	3.15	Spokane, Fort	87	42		3.16
Trenton	87	46	71.5	3.89	Tacoma	75	52	60.9	4.11
Watkins	100	48	76.3	3.20	Townsend, Fort	76	45	61.7	3.41
Waynesborough	96	38	70.3	5.53	Vashon	84	49	61.8	4.46
<i>Texas.</i>					Walla Walla, Fort. .	96	49	66.2	0.92
Austin	95	65	.....	4.63	<i>West Virginia.</i>				
Cedar Hill	99	72	.....	7.50	Clarksburg*	99	37	74.5	2.93
Cleburne *	89	62	77.2	4.00	Helvetia *	92	37	66.7	2.81
Comanche	97	64	.....	1.19	Middlebrook*	84	44	63.9	.....
Concho, Fort.	104	58	82.0	1.66	Parkersburg	93	41	70.5	2.52
Corsicana .....	.....	.....	.....	4.68	White Sulph. Sgs. .	.....	.....	.....	3.70
Decatur	93	60	76.7	3.66	<i>Wisconsin.</i>				
Gallinas	95	65	77.9	2.20	Delavan	94	35	65.9	4.33
Lampasas	94	43	74.0	5.05	Deuster .....	.....	.....	.....	2.25
McIntosh, Fort	101	63	85.3	1.11	Embarras *	94	40	71.9	3.25
Mesquite	98	61	78.5	5.55	Fond du Lac	90	56	66.9	2.59
Mexia	92	64	79.5	4.68	Fredonia	92	45	65.1	.....
New Ulm	84	71	77.9	10.42	Lancaster	92	34	65.2	7.00
Paris	97	61	78.2	4.25	Madison	89	41	67.5	2.95
Ringgold, Fort.	102	62	82.9	3.34	Manitowoc	87	34	63.3	1.11
<i>Vermont.</i>					Prairie du Chien. .	92	46	69.5	4.32
Brattleborough a ..	99	41	65.8	2.70	<i>Wyoming.</i>				
Brattleborough b ..	94	41	66.2	.....	Camp Sheridan	83	37	54.6	.....
Burlington	93	46	68.9	3.95	Laramie, Fort	108	41		0.03
Chelsea	81	40	61.4	5.22	McKinney, Fort	87	33	60.0	1.54
Jacksonville	92	37	64.5	4.57	Washakie, Fort....	91	37		2.24

† Record for 25 days.

Table of miscellaneous meteorological data for June, 1888—Signal Service observations.

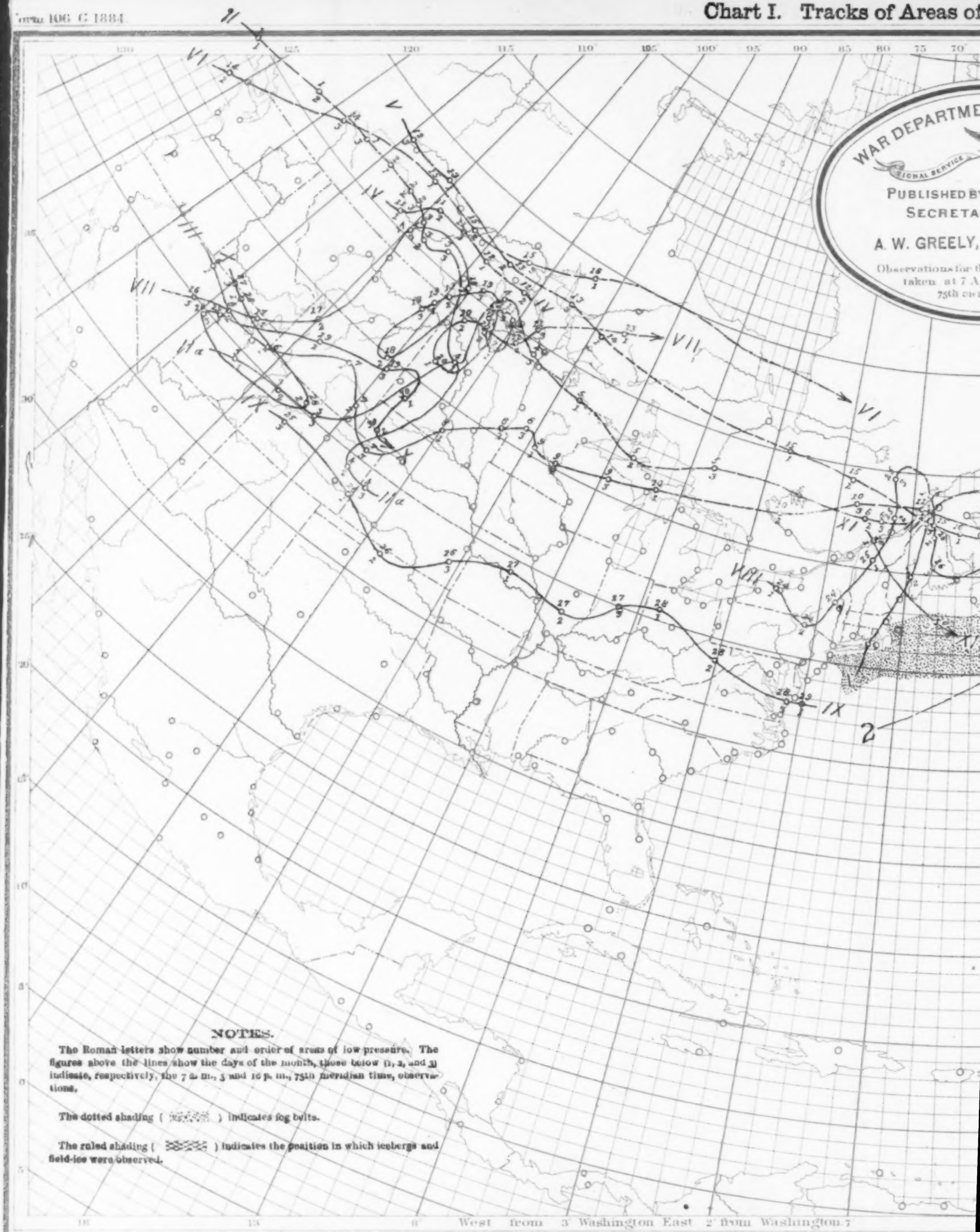
Stations and districts.	Elevation above sea level, feet.	Atmospheric pressure, in inches and hundredths.					Temperature of the air, in degrees Fahrenheit.										Winds.								
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.		Monthly mean.	Departure from normal.	Extremes.		Monthly range.	Daily ranges.		Mean relative humidity, per cent.	Mean temperature of dew-point, degrees Fahrenheit.	Precipitation, in inches.	Departure from normal precipitation, in inches.	Total movement, miles.	Prevailing direction.	Maximum velocity.		No. of rainy days.	No. of cloudy days.	No. of clear days.	
					Highest barometer.	Lowest barometer.			Max.	Min.		Greatest.	Least.							Miles p. h.	Direction.				
					Date.	Date.			Date.	Date.		Date.	Date.							Date.	Date.				
New England.																									
Eastport	53	29.81	-.06	29.87	30.20	29.50	29.70	63.5	63.5	63.5	0.0	63.5	63.5	63.5	63.5	1.68	-1.71	5.373	SW.	34	E.	24	14	3	13
Portland	99	29.78	-.05	29.87	30.24	29.51	29.73	63.0	63.0	66.3	1.7	66.3	66.3	66.3	66.3	1.94	-2.09	5.044	SW.	37	E.	10	11	5	10
Manchester	247	29.64	-.05	29.89	30.24	29.50	29.11	66.7	66.7	66.3	0.7	66.3	66.3	66.3	66.3	1.73	-1.73	5.422	NW.	22	W.	11	12	7	17
Northfield	871	29.97	-.05	29.89	30.21	29.61	29.60	63.5	63.5	66.3	1.5	66.3	66.3	66.3	66.3	6.17	5.580	5.580	SW.	30	NW.	27	14	4	17
Boston	125	29.78	-.05	29.91	30.25	29.60	29.61	66.8	66.8	66.2	1.8	66.2	66.2	66.2	66.2	2.69	-0.73	7.381	W.	36	NE.	7	12	9	13
Edgartown	14	29.90	-.02	29.92	30.24	29.61	29.63	61.2	61.2	68.1	2.8	68.1	68.1	68.1	68.1	1.51	-1.51	6.604	SW.	25	NE.	8	15	4	14
Nantucket	22	29.86	-.02	29.88	30.21	29.59	29.62	61.9	61.9	68.1	2.1	68.1	68.1	68.1	68.1	1.35	-1.43	6.670	SW.	42	SW.	16	12	2	13
Wood's Holl	26	29.90	-.06	29.93	30.26	29.65	29.61	62.3	62.3	69.3	0.7	69.3	69.3	69.3	69.3	1.69	-1.69	6.670	SW.	40	NE.	29	7	8	17
Vineyard Haven	26	29.90	-.06	29.93	30.26	29.65	29.61	62.3	62.3	69.3	0.7	69.3	69.3	69.3	69.3	1.69	-1.69	6.670	SW.	40	NE.	29	7	8	17
Block Island	26	29.90	-.06	29.93	30.26	29.65	29.61	62.3	62.3	69.3	0.7	69.3	69.3	69.3	69.3	1.69	-1.69	6.670	SW.	40	NE.	29	7	8	17
Narragansett Pier	22	29.90	-.06	29.93	30.26	29.65	29.61	62.3	62.3	69.3	0.7	69.3	69.3	69.3	69.3	1.69	-1.69	6.670	SW.	40	NE.	29	7	8	17
New Haven	107	29.81	-.06	29.92	30.25	29.65	29.60	67.8	67.8	74.1	1.3	74.1	74.1	74.1	74.1	2.15	-1.20	6.644	SW.	24	N.	8	8	2	18
New London	47	29.86	-.08	29.91	30.24	29.63	29.61	67.2	67.2	75.7	1.8	75.7	75.7	75.7	75.7	2.19	-1.96	5.521	SW.	23	E.	28	6	3	21
Mid. Atlantic States.																									
Albany	85	29.82	-.05	29.91	30.22	29.63	29.63	69.4	69.4	79.5	0.4	79.5	79.5	79.5	79.5	3.18	-0.61	3.019	SW.	30	N.	30	14	3	19
New York City	185	29.74	-.06	29.93	30.25	29.68	29.68	71.4	71.4	82.2	3.4	82.2	82.2	82.2	82.2	1.68	-1.84	5.990	SW.	48	NW.	30	7	4	20
Philadelphia	117	29.83	-.04	29.95	30.24	29.72	29.72	72.6	72.6	83.2	1.6	83.2	83.2	83.2	83.2	1.09	-2.47	7.003	SW.	38	NE.	28	5	5	17
Atlantic City	34	29.91	-.05	29.94	30.25	29.70	29.70	73.0	73.0	82.6	1.4	82.6	82.6	82.6	82.6	3.22	-0.13	6.307	SW.	36	E.	28	5	5	16
Baltimore	45	29.91	-.04	29.95	30.25	29.72	29.72	73.0	73.0	82.6	1.4	82.6	82.6	82.6	82.6	3.22	-0.13	6.307	SW.	36	E.	28	5	5	16
Washington City	106	29.85	-.04	29.97	30.28	29.74	29.74	73.0	73.0	82.6	1.4	82.6	82.6	82.6	82.6	3.22	-0.13	6.307	SW.	36	NW.	23	9	4	13
Cape Henry	658	29.28	-.06	29.30	30.5	29.75	29.75	73.8	73.8	84.9	1.1	84.9	84.9	84.9	84.9	4.79	-1.14	3.949	SW.	28	SW.	23	9	4	13
Lynchburg	658	29.28	-.06	29.30	30.5	29.75	29.75	73.8	73.8	84.9	1.1	84.9	84.9	84.9	84.9	4.79	-1.14	3.949	SW.	28	SW.	23	9	4	13
Norfolk	69	29.90	-.09	29.97	30.30	29.73	29.73	73.6	73.6	84.9	1.0	84.9	84.9	84.9	84.9	5.24	-1.52	2.782	NE.	32	NW.	24	5	6	16
S. Atlantic States.																									
Charlottesville	808	29.16	-.03	30.00	30.34	29.78	29.78	77.0	77.0	88.0	1.0	88.0	88.0	88.0	88.0	1.66	-3.62	3.181	SW.	30	NW.	2	10	6	22
Hatteras	11	30.00	-.02	30.02	30.36	29.77	29.77	73.1	73.1	88.0	0.9	88.0	88.0	88.0	88.0	4.39	-0.28	3.181	SW.	32	N.	3	8	4	13
Kitty Hawk	375	29.59	-.02	29.61	30.32	29.75	29.75	75.8	75.8	87.5	2.0	87.5	87.5	87.5	87.5	4.05	-0.28	3.181	SW.	32	N.	3	8	4	13
Raleigh	375	29.59	-.02	29.61	30.32	29.75	29.75	75.8	75.8	87.5	2.0	87.5	87.5	87.5	87.5	4.05	-0.28	3.181	SW.	32	N.	3	8	4	13
Southport	53	29.94	-.04	29.98	30.34	29.72	29.72	75.8	75.8	87.5	2.0	87.5	87.5	87.5	87.5	4.05	-0.28	3.181	SW.	32	N.	3	8	4	13
Wilmington	53	29.94	-.04	29.98	30.34	29.72	29.72	75.8	75.8	87.5	2.0	87.5	87.5	87.5	87.5	4.05	-0.28	3.181	SW.	32	N.	3	8	4	13
Charleston	53	29.94	-.04	29.98	30.34	29.72	29.72	75.8	75.8	87.5	2.0	87.5	87.5	87.5	87.5	4.05	-0.28	3.181	SW.	32	N.	3	8	4	13
Columbia	183	29.82	-.03	29.91	30.31	29.76	29.76	79.1	79.1	88.8	0.8	88.8	88.8	88.8	88.8	3.50	-2.82	4.481	SW.	34	SW.	28	10	7	13
Augusta	87	29.91	-.04	29.95	30.33	29.79	29.79	79.1	79.1	88.8	0.8	88.8	88.8	88.8	88.8	3.50	-2.82	4.481	SW.	34	SW.	28	10	7	13
Jacksonville	43	29.96	-.04	30.00	30.33	29.82	29.82	79.1	79.1	88.8	0.8	88.8	88.8	88.8	88.8	3.50	-2.82	4.481	SW.	34	SW.	28	10	7	13
Florida Peninsula.																									
Titusville	12	30.03	-.03	30.04	30.37	29.86	29.86	80.1	80.1	91.2	1.1	91.2	91.2	91.2	91.2	3.18	-3.41	5.990	SW.	30	NE.	30	12	2	14
Cedar Keys	22	30.00	-.02	30.02	30.36	29.77	29.77	75.8	75.8	85.7	2.0	85.7	85.7	85.7	85.7	4.05	-0.28	3.181	SW.	30	NE.	30	12	2	14
Key West	22	30.01	-.01	30.03	30.36	29.81	29.81	80.1	80.1	91.2	1.1	91.2	91.2	91.2	91.2	3.18	-3.41	5.990	SW.	30	NE.	30	12	2	14
Jupiter	28	30.00	-.03	30.03	30.37	29.78	29.78	79.1	79.1	88.8	0.8	88.8	88.8	88.8	88.8	3.50	-2.82	4.481	SW.	34	SW.	28	10	7	13
Sebastian	28	30.00	-.03	30.03	30.37	29.78	29.78	79.1	79.1	88.8	0.8	88.8	88.8	88.8	88.8	3.50	-2.82	4.481	SW.	34	SW.	28	10	7	13
Eastern Gulf States.																									
Atlanta	1,129	29.85	-.04	29.91	30.35	29.81	29.81	77.3	77.3	86.9	1.7	86.9	86.9	86.9	86.9	3.21	-0.51	5.990	SW.	42	SW.	28	9	6	17
Pensacola	50	29.94	-.06	29.99	30.30	29.81	29.81	78.4	78.4	86.9	1.6	86.9	86.9	86.9	86.9	4.71	-0.68	5.823	SW.	48	SW.	28	9	6	17
Mobile	35	29.96	-.03	30.00	30.36	29.77	29.77	77.5	77.5	86.9	1.6	86.9	86.9	86.9	86.9	7.25	-3.34	3.252	SW.	48	SW.	28	9	6	17
Montgomery	217	29.76	-.04	29.90	30.30	29.75	29.75	78.0	78.0	88.4	2.0	88.4	88.4	88.4	88.4	4.32	-0.09	2.952	SW.	33	NW.	28	9	6	17
Vicksburg	222	29.73	-.06	29.96	30.30	29.76	29.76	77.0	77.0	85.0	2.0	85.0	85.0	85.0	85.0	2.18	-1.87	3.991	SW.	33	W.	24	10	13	7
New Orleans	52	29.92	-.03	29.98	30.30	29.76	29.76	77.3	77.3	84.3	3.7	84.3	84.3	84.3	84.3	3.73	-0.70	4.911	SW.	36	SW.	26	13	7	15
Western Gulf States.																									
Shreveport	249	29.68	-.07	29.93	30.15	29.75	29.75	78.2	78.2	86.9	2.6	86.9	86.9	86.9	86.9	7.25	-3.34	3.252	SW.	36	N.	2	16	7	12
Fort Smith	470	29.43	-.04	29.93	30.18	29.68	29.68	75.0	75.0	86.2	2.6	86.2	86.2	86.2	86.2	4.71	-0.68	5.823	SW.	48	SW.	28	9	6	17
Little Rock	309	29.63	-.03	29.95	30.19	29.74	29.74	75.5	75.5	84.3	1.6														

Table of miscellaneous meteorological data for June, 1888—Signal Service observations—Continued.

Stations and districts.	Elevation above sea-level, feet.	Atmospheric pressure, in inches and hundredths.				Temperature of the air, in degrees Fahrenheit.										Mean relative humidity, per cent.	Mean temperature of dew-point, degrees Fahrenheit.	Precipitation, in inches.		Winds.		Total movement, miles.	Prevailing direction.	Maximum velocity.		No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.			
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.			Monthly mean.	Departure from normal.	Extremes.			Daily ranges.		Greatest.			Least.	Date.	Miles p. h.	Direction.			Date.	No. of rainy days.					No. of cloudy days.	No. of fair days.	No. of clear days.
					Highest barometer.	Lowest barometer.	Monthly range of barometer.			Max.	Min.	Date.	Mean max.	Mean min.																			Monthly range.
<i>Upper Miss. Valley.</i>																																
Saint Paul.....	831	29.96	-.07	29.84	30.20	29.49	0.71	69.8	-1.1	88.7	17	76.3	41.0	57.4	47.7	28.0	14	7.0	27	71.7	57.1	1.95	-0.63	4.063	se.	36	w.	14	10	16	10	4
La Crosse.....	744	29.13	-.01	29.91	30.24	29.61	0.63	67.9	-1.1	90.4	17	77.0	44.0	59.1	46.4	27.6	3	7.5	27	70.1	57.1	3.62	-0.56	5.980	se.	36	se.	15	11	8	14	8
Davenport.....	615	29.26	-.04	29.91	30.20	29.62	0.58	69.6	-0.4	88.0	18	78.5	46.4	61.7	41.0	23.4	7	10.3	20	72.0	59.3	3.86	-0.50	5.586	se.	50	se.	8	14	4	13	13
Des Moines.....	866	29.08	-.05	29.88	30.22	29.56	0.66	68.6	-1.4	88.0	17	78.5	43.4	59.0	44.6	29.4	11	9.7	27	73.1	59.3	3.32	-0.42	4.350	se.	36	se.	20	8	5	13	10
Dubuque.....	665	29.21	-.03	29.92	30.23	29.65	0.58	69.1	-0.1	89.3	14	78.9	42.0	59.4	45.3	29.7	7	7.5	27	72.2	59.1	3.28	-0.26	3.669	se.	25	se.	5	12	7	12	11
Keokuk.....	618	29.24	-.05	29.89	30.16	29.62	0.54	70.3	-1.7	87.7	17	79.3	46.0	62.4	41.7	25.2	5	9.4	27	73.0	60.5	5.42	-0.23	5.586	se.	36	se.	8	12	4	19	7
Cairo.....	359	29.58	-.03	29.96	30.19	29.67	0.52	72.9	-3.1	89.1	17	80.5	51.4	66.2	37.7	23.5	5	5.0	22	76.1	64.2	5.48	-1.07	4.757	se.	40	nw.	15	18	12	13	8
Springfield, Ill.....	644	29.27	-.03	29.94	30.21	29.69	0.52	69.8	-2.2	89.1	18	79.2	43.0	61.2	46.1	27.5	5	9.5	16	73.5	60.2	5.50	-0.23	4.568	se.	32	sw.	10	10	15	15	5
Saint Louis.....	571	29.33	-.04	29.93	30.16	29.65	0.51	71.2	-0.8	89.5	5	82.4	50.0	65.0	39.5	29.2	5	10.0	10	70.4	62.2	5.09	-0.13	6.955	se.	42	w.	21	14	5	17	8
<i>Missouri Valley.</i>																																
Lamar.....	1,028	28.88	.....	29.95	30.22	29.68	0.54	71.8	.....	90.4	16	81.8	47.1	63.8	43.3	25.5	4	8.4	8	79.0	64.2	5.08	-0.16	5.621	se.	36	se.	21	11	4	16	10
Springfield, Mo.....	1,356	28.53	-.04	29.93	30.15	29.69	0.46	70.9	-2.1	91.5	16	81.9	49.7	62.0	41.8	27.0	11	8.5	8	74.4	61.6	5.11	-0.23	5.370	se.	54	se.	8	13	5	16	9
Leavenworth.....	842	29.02	-.05	29.89	30.20	29.56	0.64	72.3	-0.8	90.2	16	82.4	47.8	63.2	48.4	26.5	11	8.3	21	69.0	60.6	7.77	-2.33	6.228	se.	30	se.	5	15	4	20	6
Topeka.....	1,113	28.74	-.04	29.90	30.27	29.52	0.75	72.0	-2.0	90.5	14	85.2	35.9	58.7	60.6	37.0	11	13.0	21	76.0	62.9	9.14	.....	.....	.....	.....	.....	.....	.....	.....
Valentine.....	2,614	27.13	.....	29.77	30.18	29.26	0.92	67.8	.....	100.3	15	86.9	47.0	54.9	59.2	44.2	13	11.0	20	66.5	56.9	2.30	-0.77	11.402	se.	60	se.	19	6	3	17	10
Fort Bull.....	1,600	28.08	-.13	29.74	30.21	29.16	1.05	67.3	-0.7	99.3	15	80.6	38.2	50.0	61.0	36.4	7	8.4	21	66.5	54.6	3.73	-0.27	9.602	se.	50	w.	4	12	7	11	8
Huron.....	1,307	28.42	-.11	29.79	30.24	29.24	1.00	66.1	-0.9	95.3	17	77.9	35.8	54.8	59.4	36.5	13	6.3	26	71.0	55.6	1.10	-0.31	10.304	se.	45	se.	7	8	14	8	8
Yankton.....	1,234	28.53	-.09	29.81	30.24	29.38	0.86	68.6	-0.4	95.4	17	79.3	42.8	58.8	52.6	29.8	7	8.0	26	69.8	57.6	2.83	-1.23	6.957	se.	30	nw.	9	7	5	19	6
<i>Northern slope.</i>																																
Fort Assinaboine.....	3,720	27.02	-.09	29.79	30.17	29.36	1.01	67.0	-3.8	90.6	17	70.7	31.8	49.3	58.8	39.8	6	5.6	8	65.6	45.8	4.49	-1.04	8.513	nw.	54	w.	13	14	12	15	3
Fort Custer.....	3,040	26.69	-.06	29.77	30.16	29.37	1.07	67.0	-1.0	94.0	17	73.1	36.6	53.0	57.4	32.9	14	7.8	22	63.5	50.0	4.91	-2.34	5.533	n.	40	nw.	21	12	12	15	3
Fort Maginnis.....	4,340	25.44	-.11	29.79	30.15	29.46	1.09	64.2	-3.8	79.4	17	64.2	26.2	44.5	53.2	31.5	5	8.0	19	64.0	40.9	7.31	-4.98	9.302	nw.	84	nw.	21	18	10	19	1
Helena.....	4,069	25.72	-.10	29.80	30.14	29.42	1.07	69.0	-1.2	90.7	17	69.0	39.5	50.3	50.5	35.5	17	5.3	8	58.9	43.4	1.87	-0.66	5.674	se.	40	se.	10	16	15	15	0
Poplar River.....	3,030	27.66	-.11	29.73	30.16	29.21	0.95	62.8	-3.0	101.3	18	72.0	32.5	50.5	58.8	44.0	14	6.0	8	67.8	49.4	4.94	-2.88	6.924	se.	40	nw.	21	12	9	13	8
Cheyenne.....	6,105	23.95	-.09	29.78	30.13	29.35	1.07	66.8	-2.3	92.6	28	77.0	36.8	47.6	55.8	39.4	15	19.4	1	38.1	32.1	0.50	-0.91	8.677	se.	46	w.	20	8	2	16	12
Fort Laramie.....	2,841	26.94	-.09	29.80	30.16	29.44	1.09	69.3	-1.3	98.5	30	81.6	42.0	56.6	56.5	33.6	11	19.0	5	58.4	51.8	2.76	-0.73	9.038	se.	48	se.	6	5	2	16	12
North Platte.....	3,280	26.43	.....	29.85	30.15	29.46	1.09	69.3	-1.3	98.5	30	81.6	42.0	56.6	56.5	33.6	11	19.0	5	58.4	51.8	2.76	-0.73	9.038	se.	48	se.	6	5	2	16	12
Rapid City.....	3,280	26.43	.....	29.85	30.15	29.46	1.09	69.3	-1.3	98.5	30	81.6	42.0	56.6	56.5	33.6	11	19.0	5	58.4	51.8	2.76	-0.73	9.038	se.	48	se.	6	5	2	16	12
Fort Washakie.....	2,434	26.94	-.09	29.80	30.16	29.44	1.09	69.3	-1.3	98.5	30	81.6	42.0	56.6	56.5	33.6	11	19.0	5	58.4	51.8	2.76	-0.73	9.038	se.	48	se.	6	5	2	16	12
Fort McKinney.....	2,434	26.94	-.09	29.80	30.16	29.44	1.09	69.3	-1.3	98.5	30	81.6	42.0	56.6	56.5	33.6	11	19.0	5	58.4	51.8	2.76	-0.73	9.038	se.	48	se.	6	5	2	16	12
Fort Robinson.....	2,434	26.94	-.09	29.80	30.16	29.44	1.09	69.3	-1.3	98.5	30	81.6	42.0	56.6	56.5	33.6	11	19.0	5	58.4	51.8	2.76	-0.73	9.038	se.	48	se.	6	5	2	16	12
<i>Midvale slope.</i>																																
Colorado Springs.....	5,281	24.67	-.07	29.73	30.07	29.35	1.07	67.2	.....	95.0	28	82.3	38.1	49.5	56.9	40.7	27	20.7	19	39.1	38.1	0.01	-1.22	5.767	se.	44	nw.	20	4	0	15	15
Denver.....	14,134	17.90	.....	29.80	30.10	29.43	1.07	67.2	.....	95.0	28	82.3	38.1	49.5	56.9	40.7	27	20.7	19	39.1	38.1	0.01	-1.22	5.767	se.	44	nw.	20	4	0	15	15
Pike's Peak.....	14,134	17.90	.....	29.80	30.10	29.43	1.07	67.2	.....	95.0	28	82.3	38.1	49.5	56.9	40.7	27	20.7	19	39.1	38.1	0.01	-1.22	5.767	se.	44	nw.	20	4	0	15	15
Las Animas.....	3,899	25.41	.....	29.84	30.16	29.52	0.64	72.8	-2.8	95.7	30	84.3	43.6	61.6	52.1	32.1	11	14.8	7	63.4	58.5	4.22	-1.74	6.821	se.	48	se.	12	8	1	25	4
Concordia.....	1,354	28.41	.....	29.84	30.16	29.52	0.64	72.8	-2.8	95.7	30	84.3	43.6	61.6	52.1	32.1	11	14.8	7	63.4	58.5	4.22	-1.74	6.821	se.	48	se.	12	8	1	25	4
Dodge City.....	2,524	27.28	-.06	29.85	30.15	29.46	1.09	74.5	-1.5	96.3	29	86.6	50.0	55.0	55.0	35.0	5	15.8	32	57.2	56.2	5.16	-1.92	11.621	se.	48	se.	4	7	0	15	15
Fort Reno.....	2,524	27.28	-.06	29.85	30.15	29.46	1.09	76.3	-1.3	95.0	3																					

18.





WAR DEPARTMENT
SIGNAL SERVICE
PUBLISHED BY
SECRETARY
A. W. GREELY,
Observations for the
taken at 7 A.
75th meridian

NOTES.

The Roman letters show number and order of areas of low pressure. The figures above the lines show the days of the month, those below 1, 2, and 3 indicate, respectively, the 7 a. m., 3 and 10 p. m., 75th meridian time, observations.

The dotted shading () indicates fog belts.

The ruled shading () indicates the position in which icebergs and field-ice were observed.

as of Low Pressure. June, 1888.

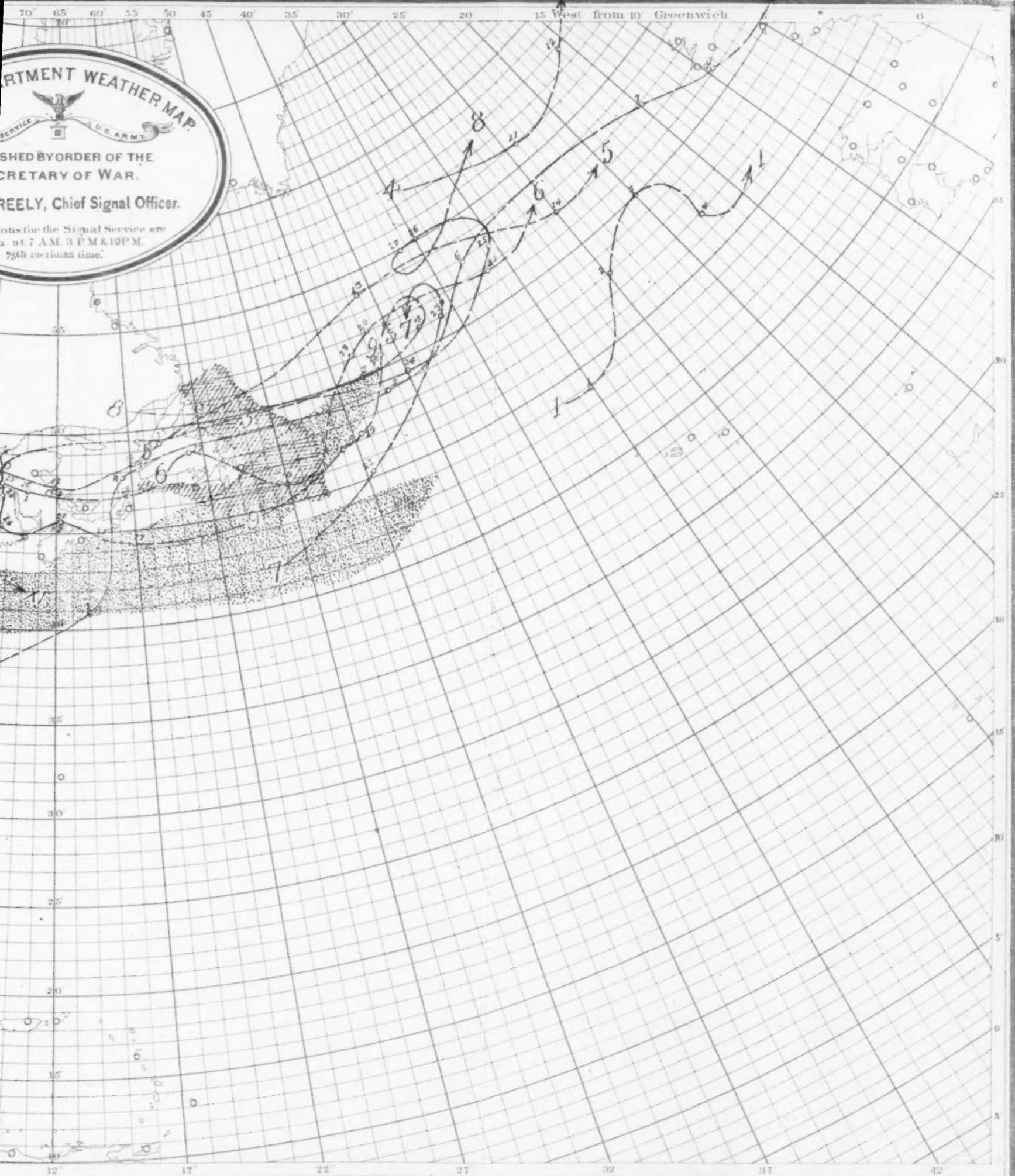
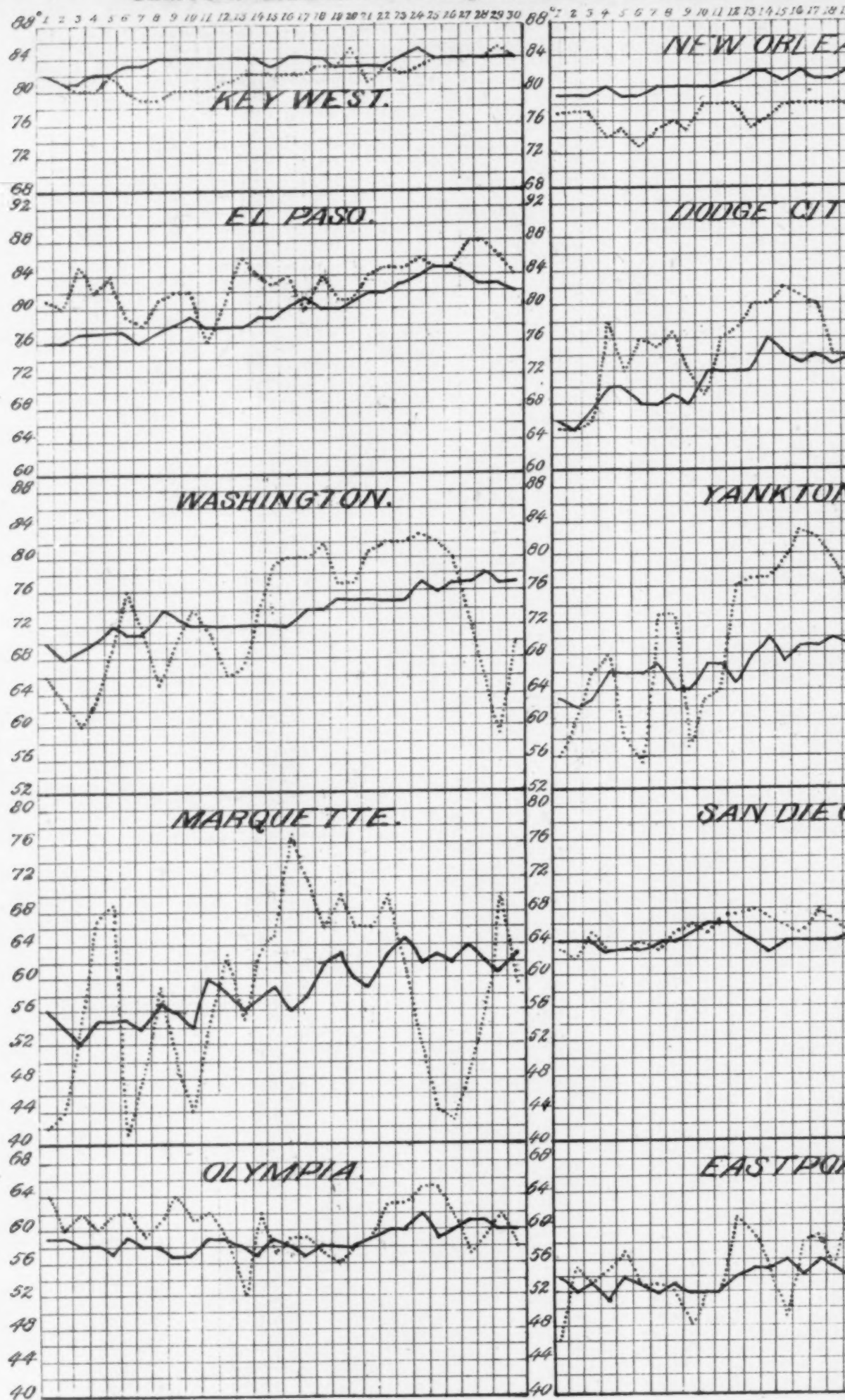


Chart III. Normal June temperatures for a number of years



years (——). Means temperatures for June, 1888, (.....).

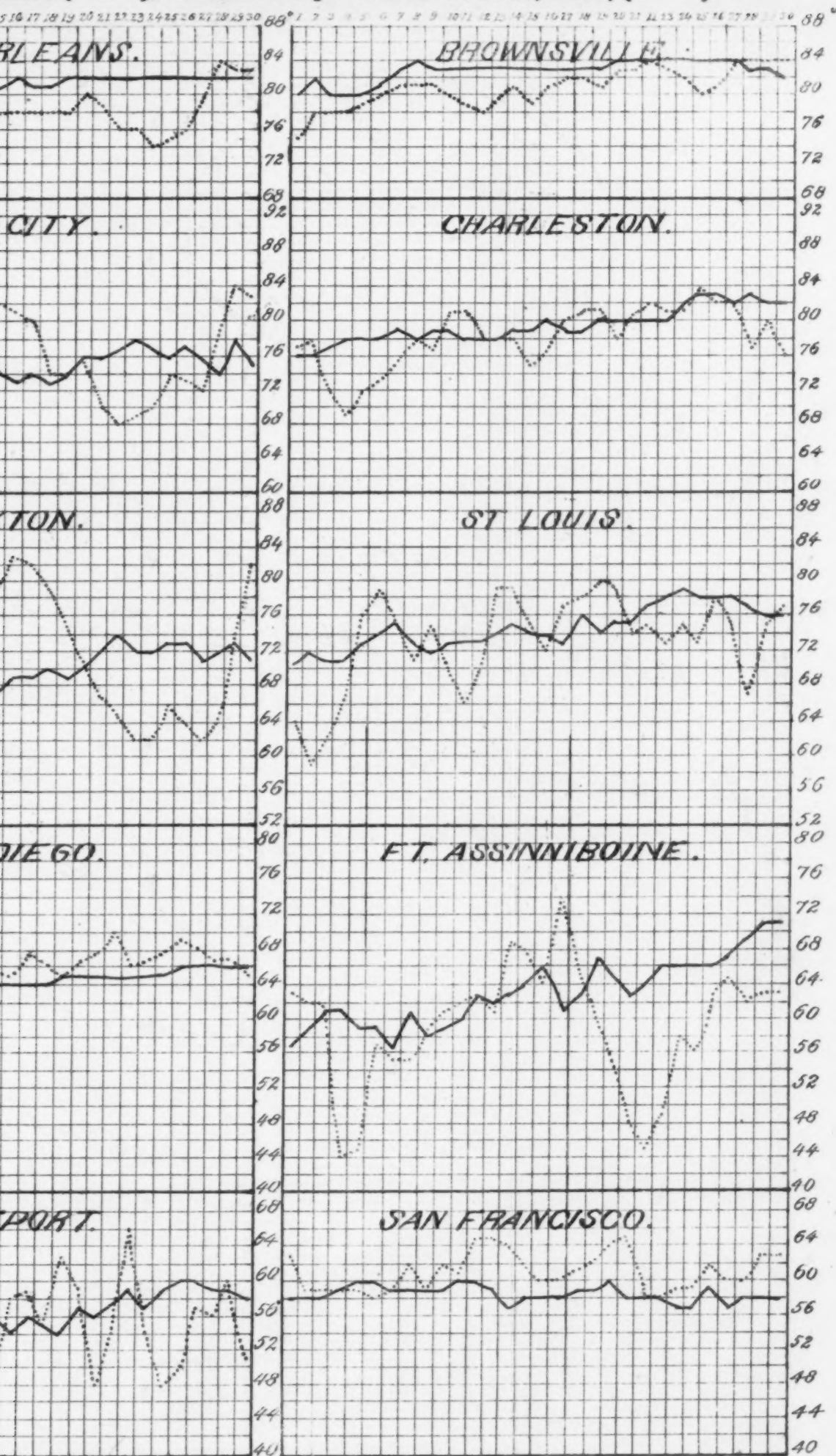


Chart II. Isobars, Isotherms, and Winds. June, 1888.

Form 100 E

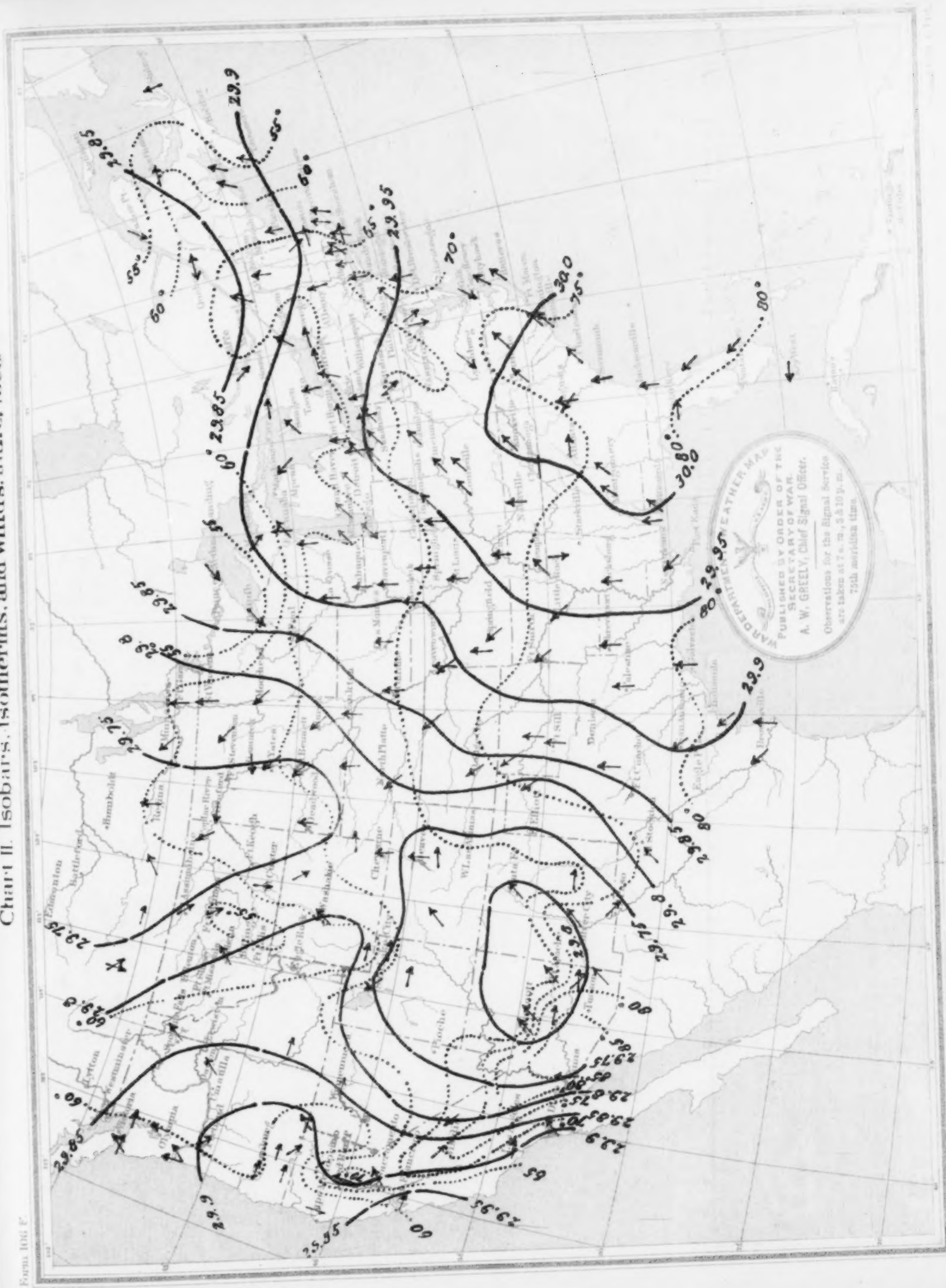
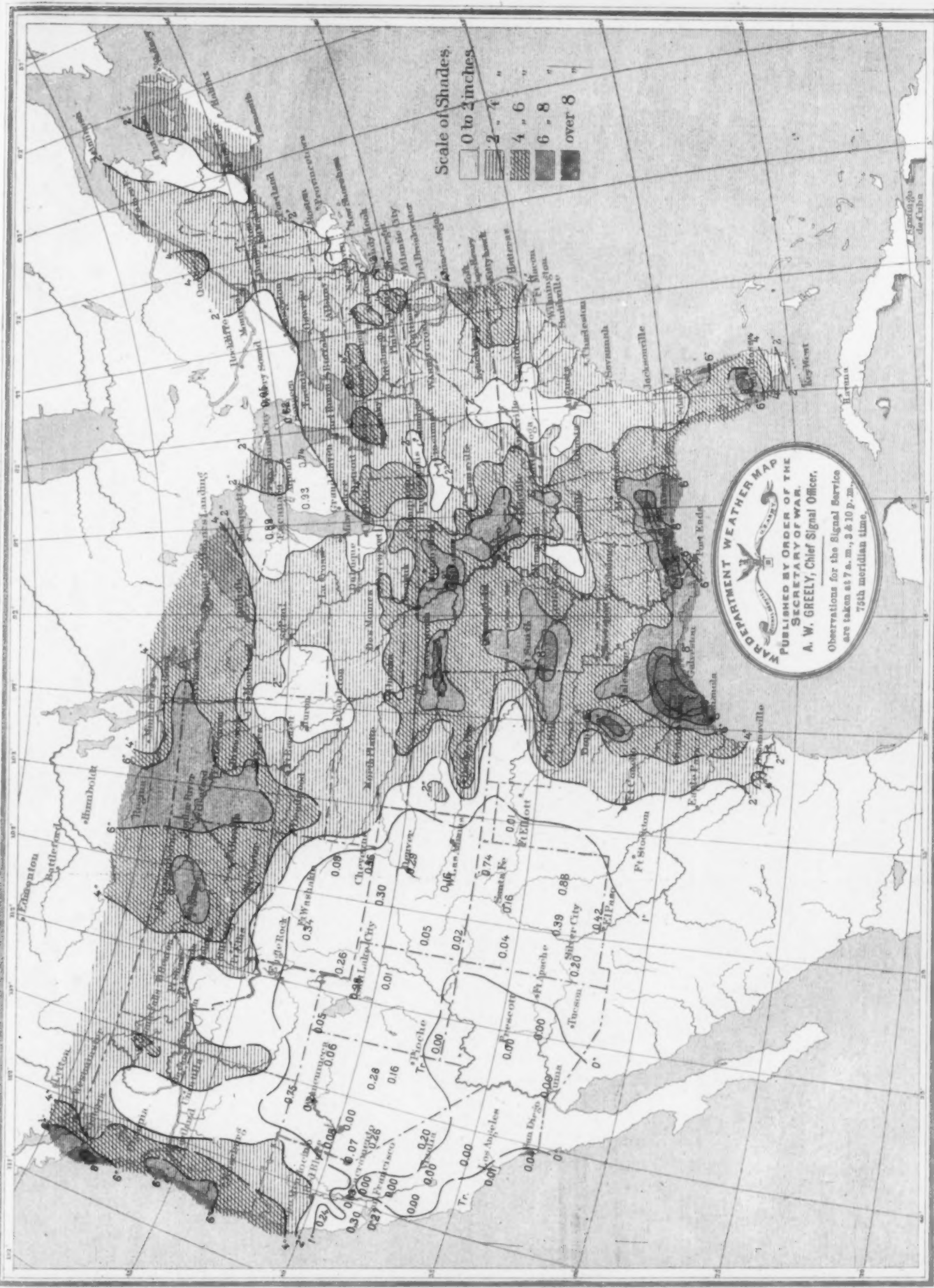
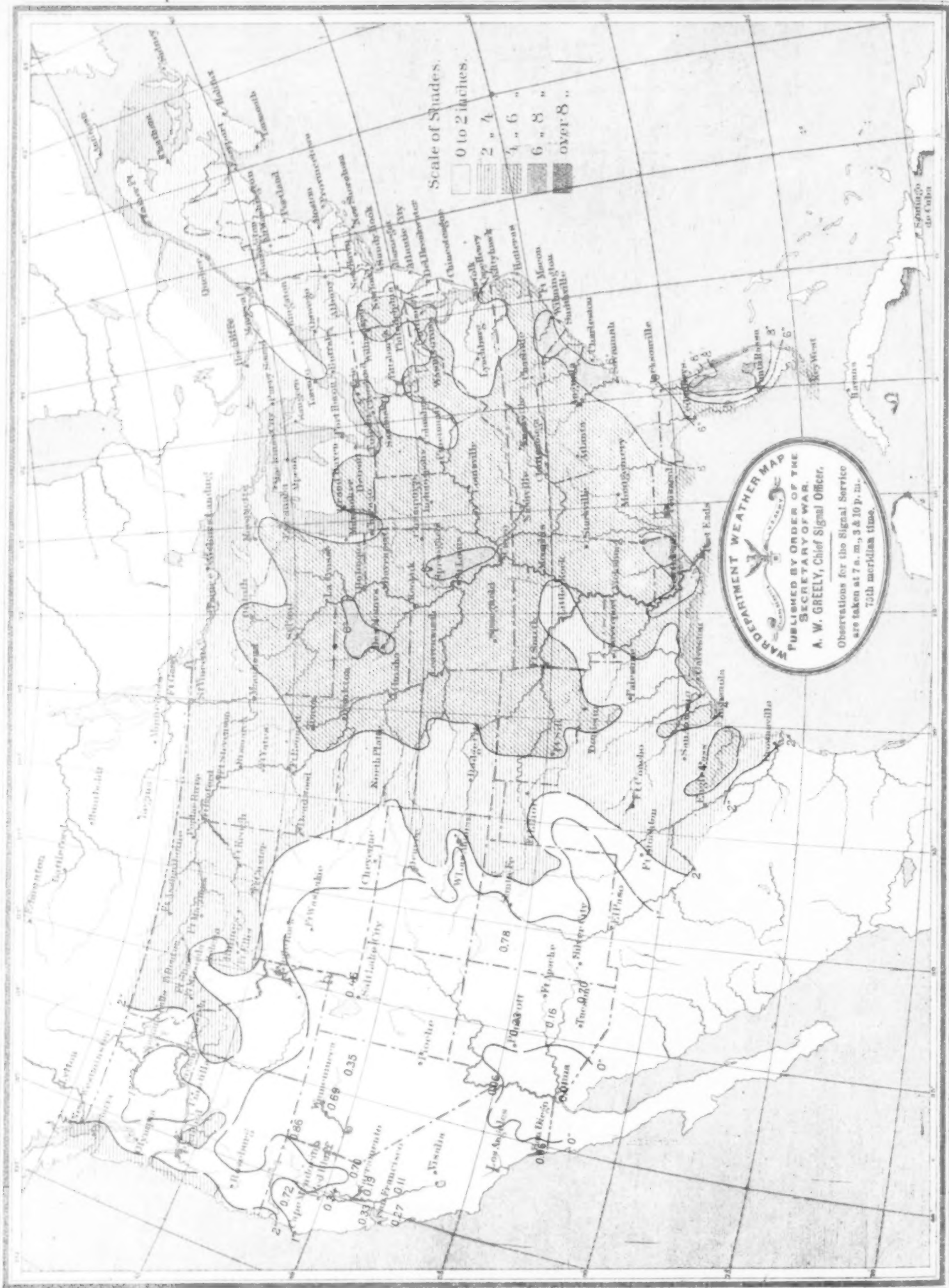


Chart IV. Precipitation, June, 1888



18 years Normal Precipitation Chart for June.

Form 106 F



List of voluntary stations of the Signal Service, with their respective observers, who furnish meteorological reports for the Monthly Weather Review. Those marked with an asterisk (*) did not send reports in time to be used in Review for June, 1888.

Place of observation and observer.	Place of observation and observer.	Place of observation and observer.	Place of observation and observer.
ALABAMA. Auburn, Alabama Weather Service. Livingston, J. W. A. Wright. New Market, Dr. Geo. D. Norris.	INDIANA. Butlerville, C. F. Hole. Jeffersonville, J. C. Loomis. Laconia, Lefe Crozier. La Fayette, Indiana Weather Service. La Grange, R. H. Berriek. Mauzy, Elwood Kirkwood. Salem, J. W. May. Sunman, B. F. Ferris. Vevay, Prof. Chas. Boerner.	MARYLAND. Barron Creek Sp'gs, Albert E. Acworth. Cumberland, E. T. Shriver. *Fallston, Prof. G. G. Curtis. Gaithersburg, John T. De Sellum. Great Falls, Washington Aqueduct. McDonogh, McDonogh Institute. *Mt St. Mary's, Mt St. Mary's College. Woodstock, Woodstock College.	NEW JERSEY—Continued. South Orange, Dr. W. J. Chandler. Vineland, Dr. O. H. Adams.
ARIZONA. Cedar Springs, J. E. Norton. *Eagle Pass, R. B. Tripp. Holbrook, David Rohe. Huachuca, J. W. Stump. Tevis, Miss Belle Tevis. Tucson, Edward L. Wetmore. Williams, J. T. Ryan. Winslow, L. W. Broberts.	INDIAN TERRITORY. Caddo Creek, B. Leming, M. D.	MASSACHUSETTS. Amherst, Miss S. C. Snell. Amherst, Massachusetts Agricultural Experimental Station. Blue Hill, Rev. A. K. Teele. Blue Hill Observatory, A. L. Rotch. Cambridge, Harvard College Obs'y. Dudley, Conant Observatory. Deerfield, Rev. A. Hazen. Fall River, C. V. S. Remington. Heath, B. B. Cutler. Marion, J. E. Hadley. Nahant, Wm. D. Hodges. Newburyport, T. V. Pike. New Bedford, Thomas R. Rodman. Provincetown, John R. Smith. Somerset, Elisha Slade. Westborough, G. S. Newcomb. Williamstown, Williams College Obs'y. Worcester, J. B. Hall.	NEW MEXICO. Albuquerque, S. M. Rowe. Colidge, H. M. Moran. Gallinas Spring, J. E. Whitmore. Las Vegas, F. W. Chatfield.
ARKANSAS. Eureka Springs, A. H. Foote. Lead Hill, Silas C. Turnbo. Little Rock, Arkansas Weather Service.	IOWA. Amana, Conrad Schadt. Ames, J. Rush Lincoln. Auburn, Edwin Miller. Bancroft, H. N. Renfrew. Cedar Rapids, H. D. Olds. Clarinda, A. S. Van Sandt. Clear Lake, Dr. J. C. Wright. Clinton, Luke Roberts. Cresco, Gregory Marshall. Cromwell, E. E. Harrison. Denmark, G. B. Brackett. Des Moines, Adolphus Voegell. Dysart, Jos. Dysart. Elkader, J. N. Hamilton. Fairfield, Geo. D. Clark. Fayette, Upper Iowa University. Fort Madison, Miss L. A. McCready. Glenwood, Seth Dean. Glenwood, A. Schappel. Grinnell, Prof. S. J. Buck. Hampton, E. C. Grenelle. Humboldt, Miss. Florence Prouty. Independence, Emil F. Wulfke. Iowa City, Prof. A. A. Veblen. Logan, Jacob T. Stern. Manson, W. L. Thompson. Maquoketa, A. B. Bowers. Monticello, H. D. Smith. Mount Pleasant, Prof. Max E. Witte. Mount Vernon, Prof. Alonzo Collin. Muscatine, J. P. Walton. Osage, G. D. Pettingill. Osceola, F. M. Kyte. Oskaloosa, Joseph Boyd. Oskaloosa, O. H. Avey. Sac City, Dr. Caleb Brown. Smithland, Dr. Chas. Rice. Vinton, T. F. McCune. Washington, Wm. A. Cook. Wesley, Wm. Ward.	MINNESOTA. Birmingham, S. Alexander. Harrisville, Dr. D. W. Mitchell. Benton Harbor, A. J. McCave. Hudson, Major A. H. Boies. Kalamazoo, W. A. Black. Lansing, Dr. H. B. Baker. Lansing, Michigan Weather Service. Marshall, W. T. Drake. Mottville, J. A. Hartzler. Thornville, John S. Caulkins. Traverse City, S. E. Wait.	NEW YORK. Ardena, Richard B. Arden. Auburn, Geo. Casey. Boyd's Corners, Thomas Manning. Brooklyn, Prof. W. C. Peckham. Cooperstown, G. Pomeroy Keese. Eden, W. P. Hunt. Factoryville, T. P. Yates. Friendship, Jesse D. Rogers. Geneva, Mrs. C. K. M. Yates. Humphrey, Chas. E. Whitney. Ithaca, Cornell University. Lyon, Dr. M. A. Feeder. Palmyra, L. D. Cummings. Penn Yan, Geo. R. Young. Rose, George Smart. Savona, M. S. Collier, M. D. Setauket, Selah B. Strong. Utica, Thomas Birt. Vermillion, E. B. Bartlett. White Plains, Prof. O. R. Willis.
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GEORGIA. Athens, Prof. L. H. Charbonnier. Forsyth, Thos. G. Scott. Marietta, G. S. Owen. Milledgeville, S. A. Cook. Thomasville, C. S. Bondurant.	KANSAS. Allison, John J. Cass. *East Norway, P. L. Gray. Elk Falls, Dr. A. C. Williams. *Emporia, Prof. J. H. Dinsmore, jr. Englewood, C. D. Perry. Globe, Wm. Featherston. Independence, J. M. Altaffer. Lawrence, Prof. F. H. Snow. Lebo, C. W. Burnet. Leoti, L. C. Vickrey. Manhattan, C. P. Blachley. Morse, R. P. Edgington. Ninnescah, E. Shaw. Salina, J. H. Gibson. *Scott, L. C. Vickrey. Topeka, Kansas Weather Service. Tribune, S. B. Jackson. *Wakefield, Wm. P. Cochran. Wellington, John H. Wolfe. *Wilson, E. Y. Doilenmayer. Yates Centre, F. R. Gray.	NEBRASKA. Crete, Nebraska Weather Service. Culbertson, G. D. Carrington. De Soto, Chas. Seltz. Fairbury, Dr. J. Humphrey. Falls City, A. B. Newkirk. Fremont, Rev. L. F. Berry. Genoa, Geo. S. Truman. Grand Island, J. H. Warren. Hay Springs, Wm. Waterman. Kimball, Wm. G. Barton. *Lincoln, University of Nebraska. Marquette, John Ellis. Syracuse, P. W. Risser. Tecumseh, W. L. Dunlap.	PENNSYLVANIA. Altoona, Chas. B. Dudley, M. D. Catawissa, Robt. M. Graham. Corry, Wm. Loveland. Drifton, H. D. Miller. Dyberry, Theo. Day. East Brook, L. E. Stunkard. Easton, Dr. J. W. Moore. Franklin, Joseph Bell. Germantown, Thos. Meehan. Grampian Hills, Nathan Moore. Meadville, David Logan. Philadelphia, Pennsylvania Weather Service. Phillipsburg, L. Ray Morgan. Quakertown, J. L. Hancock. Reading, C. M. Dechant. Salem Corners, T. B. Orchard, M. D. State College, Agricultural Experimental Station, State College. Troy, M. Gustin. Wellaborough, Hiram D. Deming. West Chester, Dr. Jesse C. Green. Westtown, Wm. F. Wickersham.
IDAHO. Lewiston, Robert Schleicher.	KENTUCKY. Bowling Green, M. H. Crump. Carlisle, W. H. Fritts. Frankfort, E. C. Went. Millersburg, C. Pope.	NEVADA. Carson City, Chas. W. Friend. Carson City, Nevada Weather Service.	
ILLINOIS. Charleston, J. B. Dazey. Collinsville, Dr. J. L. R. Wadsworth. Jacksonville, P. J. Hasenstab. Oswego, John S. Seely. *Palestine, John E. Templeton. *Pekin, Rev. J. E. Terborg. Philo, H. A. Burr. Riley, John W. James. Rockford, T. D. Robertson. Sycamore, Roswell Dow. Sandwich, Dr. N. E. Ballou. South Evanston, Dr. M. D. Ewell. Springfield, Illinois Weather Service. *Windsor, A. H. Hatch.	LOUISIANA. Grand Coteau, Rev. C. M. Widman, S. J. Liberty Hill, E. A. Crawford. Luling, F. M. Rogers. New Orleans, Louisiana Weather Service. Port Eads, Mrs. C. L. Kleinpeter.	NEW HAMPSHIRE. Antrim, Frank W. Palmer. Berlin Mills, Q. A. Bridges. Concord, W. L. Foster. Nashua, Chas. H. Webster. Ashland, Belmont, Bristol, Lake Village, Weir's Bridge, Wolfeborough,	
	MAINE. Bar Harbor, Joseph Wood. Cornish, Silas West. Gardiner, Henry Richards. Kent's Hill, W. C. Strong. Orono, Prof. M. C. Fernald.	NEW JERSEY. Beverly, C. F. Richardson. Clayton, W. T. Wilson. Egg Harbor City, H. Y. Postma. Moorestown, Thos. J. Beans. New Brunswick, New Jersey Weather Service. Readington, John Fleming.	

Place of observation and observer.	Place of observation and observer.	Place of observation and observer.	Place of observation and observer.
SOUTH CAROLINA. *Aiken, Dr. W. H. Geddings. Black's, Jos. Black. Cedar Springs, J. T. Bayerly. Columbia, South Carolina Weather Service. Graham's Turnout, R. H. Sonntag. Kirkwood, Colin Macrae. Stateburg, Dr. W. W. Anderson.	TEXAS—Continued. Gallinas, Lum Woodruff. Galveston, Texas Weather Service. Lampasas, Dr. C. M. Ramsdell. Mesquite, Silas G. Lackey. Mexia, Chas. F. Mercer. New Ulm, C. Runge. *Pine Mills, W. E. Burkett. *Silver Falls, C. M. Tilford. Santa Maria, L. E. Blochman.	VIRGINIA—Continued. Marion, A. T. Lincoln. Summit, J. R. Sim. University of Va., James Wearmouth. Variety Mills, J. H. Mecklem. Wytheville, Howard Shriver.	WISCONSIN—Continued. Fond du Lac, J. C. Wedge. Fredonia, B. H. Meyer. Lancaster, Edward Pollock. Madison, Washburn Observatory. Manitowoc, Miss Clasina Lups. Prairie du Chien, College Sacred Heart. Waucousta, G. H. Yapp.
TENNESSEE. Ashwood, Rev. C. P., Williams. Austin, P. B. Calhoun. Milan, Dr. M. D. L. Jordan. Nashville, State Board of Health.	VERMONT. *Brattleborough, W. H. Childs. Burlington, W. B. Gates. Lunenburg, Dr. Hiram A. Cutting. Manchester, Rev. E. P. Wild. Middleburg, S. Holton. Saint Johnsbury, F. Fairbanks. Strafford, H. F. J. Scribner.	WASHINGTON TERRITORY. Blakeley, R. M. Hoskithson. Tacoma, E. N. Fuller. Yashon, Mrs. C. B. Carpenter.	FOREIGN. Grand Turk, W. Indies, Geo. I. Gibbs. Guanaquato, Mexico, Met'l Obs'y. *Hamilton, Bermuda, Russell Hastings. Killisnoo, Alaska, Jos. Zuhoff. Leon, Mexico, Prof. M. Leal. Mexico, Mexico, Meteorological Obs'y. Monterey, Mexico, Dr. Wm. De Rye. Montreal, C. H. McLeod. New Westminster, B.C., Capt. Adolphus Peele.
TEXAS. Austin, Oscar Samostz. Cedar Hill, J. P. Berry. Cleburne, Dr. T. C. Osborn. Colorado, Fred R. Blount. Comanche, E. N. Wiesendanger. Corsicana, W. H. Hamilton. Decatur, H. D. Donald.	VIRGINIA. Bird's Nest, C. R. Moore. Christianburg, H. D. Walters. Dale Enterprise, J. L. Heatwoll.	WEST VIRGINIA. Clarksburg, R. T. Lowndes. Hartmonsville, W. C. Tobbs. Helvetia, Dr. C. T. Stucky. Middlebrook, S. F. H. Hewit. Parkersburg, T. G. Field. White Sulphur Springs, T. Surber.	WISCONSIN. Beloit, Beloit College Observatory. Delavan, George L. Collie. Deuster, G. H. Kruschke. Embarras, J. E. Breed.

Military posts from which meteorological reports were received, through the Surgeon General of the Army, in time to be used in the preparation of the Monthly Weather Review for June, 1888.

Alabama. Mount Vernon B'ks.	California—Cont'd. Bidwell, Fort. Gaston, Fort. Mason, Fort. Presidio of San F.	Dakota—Cont'd. Sully, Fort. Totten, Fort. Yates, Fort.	Kansas. Hays, Fort. Riley, Fort.	Nebraska. Niobrara, Fort. Robinson, Fort. Sidney, Fort.	New York. Columbus, Fort. Madison Barracks. Niagara, Fort. Plattsburg Barracks. West Point.	Virginia. Monroe, Fort. Washington Ter. Spokane, Fort. Townsend, Fort. Walla Walla, Fort.
Arizona. Huachuca, Fort. McDowell, Fort. Mojave, Fort.	Colorado. Lewis, Fort.	Florida. Saint Francis B'ks.	Maryland. McHenry, Fort.	Nevada. McDermitt, Fort.	Oregon. Klamath, Fort.	Wyoming. Laramie, Fort. McKinney, Fort. Sheridan, Camp. Washakie, Fort.
Arkansas. Hot Springs.	Dakota. A. Lincoln, Fort. Meade, Fort. Pembina, Fort. Randall, Fort. Sisseton, Fort.	Idaho. Boisé Barracks. Sherman, Fort.	Michigan. Brady, Fort.	New Mexico. Bayard, Fort. Selden, Fort. Union, Fort. Wingate, Fort.	Texas. Concho, Fort. McIntosh, Fort. Ringgold, Fort.	
California. Angel Island. Alcatraz Island. Benicia Barracks.		Indian Territory. Gibson, Fort. Reno, Fort. Supply, Fort.	Minnesota. Snelling, Fort.	Montana. Keogh, Fort. Missoula, Fort. Shaw, Fort.		

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